CPC COOPERATIVE PATENT CLASSIFICATION

H ELECTRICITY

(NOTE omitted)

H01 ELECTRIC ELEMENTS

(NOTES omitted)

H01J ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS (spark-gaps H01T; electric arc lamps H05B 31/00; particle accelerators H05H)

NOTES

1. This subclass covers only devices for producing, influencing, or using a flow of electrons or ions, e.g. for controlling, indicating, or switching of electric current, counting electric pulses, producing light or other electromagnetic oscillations, such as X-rays, or for separating or analysing radiation or particles, and having a closed or substantially closed casing containing a chosen gas, vapour, or vacuum, upon the pressure and nature of which the characteristics of the device depend. Light sources using a combination (other than covered by group H01J 61/96 of this subclass) of discharge and other kinds of light generation are dealt with in H05B 35/00.
2. In this subclass, groups H01J 1/00 - H01J 7/00 relate only to:
   i. details of an unspecified kind of discharge tube or lamp, or
   ii. details mentioned in a specification as applicable to two or more kinds of tubes or lamps as defined by groups H01J 11/00, H01J 13/00, H01J 15/00, H01J 17/00, H01J 21/00, H01J 25/00, H01J 27/00, H01J 31/00, H01J 33/00, H01J 35/00, H01J 37/00, H01J 40/00, H01J 41/00, H01J 47/00, H01J 49/00, H01J 61/00, H01J 63/00 or H01J 65/00, hereinafter called basic kinds. A detail only described with reference to, or clearly only applicable to, tubes or lamps of a single basic kind is classified in the detail group appropriate to tubes or lamps of that basic kind, e.g. H01J 17/04.
3. In this subclass, the following term is used with the meaning indicated:
   - "lamp" includes tubes emitting ultraviolet or infrared light.
4. Attention is drawn to the definition of the expression "spark gaps" given in the Note following the title of subclass H01T.
5. Apparatus or processes specially adapted for the manufacture of electric discharge tubes, discharge lamps, or parts thereof are classified in group H01J 9/00.

WARNING

In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

1/00 **Details of electrodes, of magnetic control means, of screens, or of the mounting or spacing thereof, common to two or more basic types of discharge tubes or lamps** (details of electron-optical or ion-optical arrangements H01J 3/00)

1/02 . Main electrodes
1/025 . . {Hollow cathodes}
1/04 . . Liquid electrodes, e.g. liquid cathode
1/05 . . . characterised by material
1/06 . . . Containers for liquid-pool electrodes; Arrangement or mounting thereof
1/08 . . . Positioning or moving the cathode spot on the surface of a liquid-pool cathode
1/10 . . . Cooling, heating, circulating, filtering, or controlling level of liquid in a liquid-pool electrode
1/12 . . Cathodes having mercury or liquid alkali metal deposited on the cathode surface during operation of the tube
1/13 . . Solid thermionic cathodes
1/135 . . . {Circuit arrangements therefor, e.g. for temperature control}
1/14 . . . characterised by the material
1/142 . . . . with alkaline-earth metal oxides, or such oxides used in conjunction with reducing agents, as an emissive material
1/144 . . . . with other metal oxides as an emissive material
1/146 . . . . with metals or alloys as an emissive material
1/148 . . . . with compounds having metallic conductive properties, e.g. lanthanum boride, as an emissive material
1/15 . . . Cathodes heated directly by an electric current
1/16 . . . . characterised by the shape
1/18 . . . . Supports; Vibration-damping arrangements
1/20 . . . Cathodes heated indirectly by an electric current; Cathodes heated by electron or ion bombardment
1/22 . . . . Heaters
1/24 . . . . Insulating layer or body located between heater and emissive material
1/26 . . . . Supports for the emissive material
1/28 . . . . Dispenser-type cathodes, e.g. L-cathode
1/30 . . Cold cathodes, e.g. field-emissive cathode
1/304 . . . Field-emissive cathodes
1/3042 . . . . {microengineered, e.g. Spindt-type}
1/3044 . . . . . {Point emitters}
1/3046 . . . . . {Edge emitters}
1/3048 . . . . {Distributed particle emitters}
1/308 . . . Semiconductor cathodes, e.g. cathodes with PN junction layers

1/312 . . . having an electric field perpendicular to the surface, e.g. tunnel-effect cathodes of metal-insulator-metal [MIM] type {(H01J 1/304-H01J 1/308 take precedence)}
1/316 . . . having an electric field parallel to the surface, e.g. thin film cathodes
1/32 . . Secondary-electron-emitting electrodes (H01J 1/35 takes precedence)
1/34 . . Photo-emissive cathodes (H01J 1/35 takes precedence)
1/35 . . Electrodes exhibiting both secondary emission and photo-emission
1/36 . . Solid anodes; Solid auxiliary anodes for maintaining a discharge
1/38 . . . characterised by the material
1/40 . . . forming part of the envelope of the tube or lamp
1/42 . . . Cooling of anodes (cooling rotary anodes H01J 1/44); Heating of anodes
1/44 . . . Rotary anodes; Arrangements for rotating anodes; Cooling rotary anodes
1/46 . Control electrodes, e.g. grid (for igniting arrangements H01J 7/30); Auxiliary electrodes (auxiliary anodes for maintaining a discharge H01J 1/36)
1/48 . . characterised by the material
1/50 . Magnetic means for controlling the discharge
1/52 . Screens for shielding; Guides for influencing the discharge; Masks interposed in the electron stream
1/53 . Electrodes intimately associated with a screen on or from which an image or pattern is formed, picked-up, converted, or stored
1/54 . Screens on or from which an image or pattern is formed, picked-up, converted, or stored; Luminescent coatings on vessels
1/56 . . acting as light valves by shutter operation, e.g. for eidophor
1/58 . . acting by discolouration, e.g. halide screen
1/60 . . Incandescent screens
1/62 . . Luminescent screens; Selection of materials for luminescent coatings on vessels
1/63 . . . characterised by the luminescent material
1/64 . . . characterised by the binder or adhesive for securing the luminescent material to its support
1/66 . . . Supports for luminescent material
1/68 . . . with superimposed luminescent layers
1/70 . . . with protective, conductive, or reflective layers
1/72 . . . with luminescent material discontinuously arranged, e.g. in dots or lines
1/74 . . . . with adjacent dots or lines of different luminescent material
1/76 . . . provided with permanent marks or references
1/78 . . Photoelectric screens; Charge-storage screens
1/88 . Mounting, supporting, spacing, or insulating of electrodes or of electrode assemblies
1/90 . . Insulation between electrodes or supports within the vacuum space
1/92 . . Mountings for the electrode assembly as a whole
1/94 . . Mountings for individual electrodes
1/96 . . Spacing members extending to the envelope
1/98 . . . without fixed connection between spacing member and envelope

3/00 Details of electron-optical or ion-optical arrangements common to two or more basic types of discharge tubes or lamps

3/02 . Electron guns
3/021 . . {Electron guns using a field emission, photo emission, or secondary emission electron source}
3/022 . . . {with microengineered cathode, e.g. Spindt-type}
3/023 . . {Electron guns using electron multiplication}
3/024 . . {Electron guns using thermionic emission of cathode heated by electron or ion bombardment or by irradiation by other energetic beams, e.g. by laser}
3/025 . . {Electron guns using a discharge in a gas or a vapour as electron source (gas-filled discharge tubes with gaseous cathodes H01J 15/00)}
3/026 . . {Eliminating deleterious effects due to thermal effects, electric or magnetic field (H01J 3/021 - H01J 3/025 take precedence)}
3/027 . . {Construction of the gun or parts thereof (H01J 3/021 - H01J 3/025, H01J 3/026 and H01J 3/028 take precedence)}
3/028 . . {Replacing parts of the gun; Relative adjustment (H01J 3/021 - H01J 3/025 take precedence)}
3/029 . . {Schematic arrangements for beam forming}
3/04 . Ion guns
3/06 . two or more guns being arranged in a single vacuum space, e.g. for plural-ray tubes (H01J 3/07 takes precedence)
3/07 . Arrangements for controlling convergence of a plurality of beams
3/08 . Arrangements for controlling intensity of ray or beam (H01J 3/02, H01J 3/04 take precedence)
3/10 . Arrangements for centring ray or beam (H01J 3/02, H01J 3/04 take precedence)
3/12 . Arrangements for controlling cross-section of ray or beam; Arrangements for correcting aberration of beam, e.g. due to lenses (H01J 3/02, H01J 3/04 take precedence)
3/14 . Arrangements for focusing or reflecting ray or beam (H01J 3/02, H01J 3/04 take precedence)
3/16 . . Mirrors
3/18 . . Electrostatic lenses
3/20 . . Magnetic lenses
3/22 . . . using electromagnetic means only
3/24 . . . using permanent magnets only
3/26 . Arrangements for deflecting ray or beam
3/28 . . along one straight line or along two perpendicular straight lines
3/30 . . . by electric fields only
3/32 . . . by magnetic fields only
3/34 . . along a circle, spiral, or rotating radial line
3/36 . Arrangements for controlling the ray or beam after passing the main deflection system, e.g. for post-acceleration or post-concentration
3/38 . Mounting, supporting, spacing, or insulating electron-optical or ion-optical arrangements
3/40 . Arrangements for removing or diverting unwanted particles, e.g. for negative ions or fringing electrons; Arrangements for velocity or mass selection

5/00 Details relating to vessels or to leading-in conductors common to two or more basic types of discharge tubes or lamps

5/02 . Vessels; Containers; Shields associated therewith; Vacuum locks
5/03 . . Arrangements for preventing or mitigating effects of implosion of vessels or containers
5/04 . . Vessels or containers characterised by the material thereof
5/06 . . Vessels or containers specially adapted for operation at high tension, e.g. by improved potential distribution over surface of vessel
5/08 . . provided with coatings on the walls thereof; Selection of materials for the coatings (luminescent coatings H01J 1/62)
5/10 . . . on internal surfaces
5/12 . . Double-wall vessels or containers
5/125 . . . {with a gas tight space between both walls}
5/14 . . Dismountable vessels or containers, e.g. for replacing cathode heater
5/16 . . Optical or photographic arrangements structurally combined with the vessel
5/18 . . Windows permeable to X-rays, gamma-rays, or particles
5/20 . Seals between parts of vessels
5/22 . . Vacuum-tight joints between parts of vessel
5/24 . . . between insulating parts of vessel
5/26 . . . between insulating and conductive parts of vessel
5/28 . . . between conductive parts of vessel
5/30 . . . using packing-material, e.g. sealing-liquid or elastic insert
5/32 . Seals for leading-in conductors
5/34 . . for an individual conductor (pinched-stem seals H01J 5/38; end-disc seals H01J 5/40; annular seals H01J 5/44)
5/36 . . . using intermediate part
5/38 . . Pinched-stem or analogous seals
5/40 . . End-disc seals, e.g. flat header
5/42 . . . using intermediate part
5/44 . . Annular seals disposed between the ends of the vessel
5/46 . Leading-in conductors
5/48 . Means forming part of the tube or lamp for the purpose of supporting it
5/50 . Means forming part of the tube or lamps for the purpose of providing electrical connection to it
5/52 . . directly applied to or forming part of the vessel
5/54 . . supported by a separate part, e.g. base
5/56 . . . Shape of the separate part
5/565 . . . . {Bases for circular lamps}
5/58 . . . Means for fastening the separate part to the vessel, e.g. by cement
5/60 . . . . for fastening by mechanical means
5/62 . . . Connection of wires protruding from the vessel to connectors carried by the separate part

7/00 Details not provided for in the preceding groups and common to two or more basic types of discharge tubes or lamps

7/02 . Selection of substances for gas fillings; Specified operating pressure or temperature
7/04 . . having one or more carbon compounds as the principal constituent
7/06 . . having helium, argon, neon, krypton, or xenon as the principal constituent
7/08 . . having a metallic vapour as the principal constituent
7/10 . . . mercury vapour
7/12 . . . vapour of an alkali metal
7/14 . Means for obtaining or maintaining the desired pressure within the vessel
7/16 . . Means for permitting pumping during operation of the tube or lamp
7/18 . . Means for absorbing or adsorbing gas, e.g. by gettering
7/183 . . . {Composition or manufacture of getters}
7/186 . . . {Getter supports}
7/20 . . Means for producing, introducing, or replenishing gas or vapour during operation of the tube or lamp
7/22 . . Tubulations therefor, e.g. for exhausting; Closures therefor
7/24 . Cooling arrangements; Heating arrangements; Means for circulating gas or vapour within the discharge space
7/26 . . by flow of fluid through passages associated with tube or lamp
7/28 . . by latent heat or evaporation of cooling liquid
7/30 . Igniting arrangements
7/32 . . having resistive or capacitative igniter
7/34 . . . having resistive igniter only
7/36 . . Igniting by movement of a solid electrode
7/38 . . Igniting by movement of vessel as a whole, e.g. tilting
7/40 . . Igniting by associated radioactive materials or fillings
7/42 . Means structurally associated with the tube or lamp for indicating defects or previous use
7/44 . One or more circuit elements structurally associated with the tube or lamp
7/46 . . Structurally associated resonator having distributed inductance and capacitance

9/00 Apparatus or processes specially adapted for the manufacture {, installation, removal, maintenance} of electric discharge tubes, discharge lamps, or parts thereof; Recovery of material from discharge tubes or lamps

9/003 . {Auxiliary devices for installing or removing discharge tubes or lamps}
9/006 . . {for fluorescent lamps}
9/02 . Manufacture of electrodes or electrode systems
9/022 . . {of cold cathodes}
9/025 . . . {of field emission cathodes}
9/027 . . . {of thin film cathodes}
9/04 . . of thermionic cathodes
9/042 . . . {Manufacture, activation of the emissive part}
9/045 . . . . {Activation of assembled cathode}
9/047 . . . . {Cathodes having impregnated bodies (H01J 9/045 takes precedence)}
9/06 . . . Machines therefor
9/08 . . Manufacture of heaters for indirectly-heated cathodes
9/10 . . . Machines therefor
9/12 . . of photo-emissive cathodes; of secondary-emission electrodes
9/125 . . . {of secondary emission electrodes}
9/14 . . of non-emitting electrodes
9/142 . . . {of shadow-masks for colour television tubes}

9/144 . . . . {Mask treatment related to the process of dot deposition during manufacture of luminescent screen}
9/146 . . . . {Surface treatment, e.g. blackening, coating (H01J 9/144 takes precedence)}
9/148 . . . {of electron emission flat panels, e.g. gate electrodes, focusing electrodes or anode electrodes}
9/16 . . . Machines for making wire grids
9/18 . . Assembling together the component parts of electrode systems
9/185 . . . {of flat panel display devices, e.g. by using spacers}
9/20 . Manufacture of screens on or from which an image or pattern is formed, picked up, converted or stored; Applying coatings to the vessel
9/205 . . {Applying optical coatings or shielding coatings to the vessel of flat panel displays, e.g. applying filter layers, electromagnetic interference shielding layers, anti-reflection coatings or anti-glare coatings}
9/22 . . Applying luminescent coatings
9/221 . . . {in continuous layers}
9/222 . . . . {constituted by coated granules emitting light of different colour}
9/223 . . . . {by uniformly dispersing of liquid}
9/224 . . . . {by precipitation}
9/225 . . . . {by electrostatic or electrophoretic processes}
9/227 . . . with luminescent material discontinuously arranged, e.g. in dots or lines
9/2271 . . . . {by photographic processes (final treatment of shadow-mask prior to or after dot deposition H01J 9/144)}
9/2272 . . . . . {Devices for carrying out the processes, e.g. light houses}
9/2273 . . . . . {Auxiliary lenses and filters}
9/2274 . . . . . {Light sources particularly adapted therefor}
9/2275 . . . . {including the exposition of a substance responsive to a particular radiation}
9/2276 . . . . {Development of latent electrostatic images (per se G03G 15/06)}
9/2277 . . . . {by other processes, e.g. serigraphy, decalcomania}
9/2278 . . . . {Application of light absorbing material, e.g. between the luminescent areas}
9/233 . . Manufacture of photoelectric screens or charge-storage screens
9/236 . Manufacture of magnetic deflecting devices for cathode-ray tubes
9/24 . Manufacture or joining of vessels, leading-in conductors or bases
9/241 . . {the vessel being for a flat panel display (H01J 9/261 takes precedence; flat discharge lamps H01J 9/248)}
9/242 . . . {Spacers between faceplate and backplate}
9/244 . . {specially adapted for cathode ray tubes (H01J 9/241, H01J 9/26 take precedence)}
9/245 . . {specially adapted for gas discharge tubes or lamps (H01J 9/241, H01J 9/26 take precedence)}
9/247 . . . {specially adapted for gas-discharge lamps}
9/248 . . . . {the vessel being flat}
9/26 . . Sealing together parts of vessels
9/261 . . . {the vessel being for a flat panel display (for flat discharge lamps H01J 9/268)}
9/263 . . . {specially adapted for cathode-ray tubes (H01J 9/261 takes precedence)}
9/265 . . . {specially adapted for gas-discharge tubes or lamps (H01J 9/261 takes precedence)}
9/266 . . . . {specially adapted for gas-discharge lamps}
9/268 . . . . . {the vessel being flat}
9/28 . . Manufacture of leading-in conductors
9/30 . . Manufacture of bases
9/32 . . Sealing leading-in conductors
9/323 . . . {Sealing leading-in conductors into a discharge lamp or a gas-filled discharge device}
9/326 . . . . {making pinched-stem or analogous seals}
9/34 . . Joining base to vessel
9/36 . . Joining connectors to internal electrode system
9/38 . Exhausting, degassing, filling, or cleaning vessels
9/385 . . Exhausting vessels
9/39 . . Degassing vessels
9/395 . . Filling vessels
9/40 . Closing vessels
9/42 . Measurement or testing during manufacture
9/44 . Factory adjustment of completed discharge tubes or lamps to comply with desired tolerances
9/445 . . {Aging of tubes or lamps, e.g. by "spot knocking" (cathode activation H01J 9/045)}
9/46 . Machines having sequentially arranged operating stations
9/48 . . with automatic transfer of workpieces between operating stations
9/50 . Repairing or regenerating used or defective discharge tubes or lamps
9/505 . . {Regeneration of cathodes}
9/52 . Recovery of material from discharge tubes or lamps (H01J 9/50 takes precedence)

11/00 Gas-filled discharge tubes with alternating current induction of the discharge, e.g. alternating current plasma display panels [AC-PDP] (circuits or methods for driving PDPs G09G 3/28)**; Gas-filled discharge tubes without any main electrode inside the vessel; Gas-filled discharge tubes with at least one main electrode outside the vessel**

NOTES

1. When classifying in this group, classification is made in all appropriate places.
2. In this group, the following term is used with the meaning indicated:
   - "main electrode" means any of a sustain electrode, scan electrode or address electrode.

11/10 . AC-PDPs with at least one main electrode being out of contact with the plasma
11/12 . . with main electrodes provided on both sides of the discharge space
11/14 . . with main electrodes provided only on one side of the discharge space
11/16 . . with main electrodes provided inside or on the side face of the spacers
11/18 . . containing a plurality of independent closed structures for containing the gas, e.g. plasma tube array [PTA] display panels
11/20 . Constructional details

11/22 . . Electrodes, e.g. special shape, material or configuration
11/24 . . . Sustain electrodes or scan electrodes
11/26 . . . Address electrodes
11/28 . . . Auxiliary electrodes, e.g. priming electrodes or trigger electrodes
11/30 . . . Floating electrodes
11/32 . . . Disposition of the electrodes
11/34 . . Vessels, containers or parts thereof, e.g. substrates
11/36 . . . Spacers, barriers, ribs, partitions or the like
11/38 . . . Dielectric or insulating layers
11/40 . . . Layers for protecting or enhancing the electron emission, e.g. MgO layers
11/42 . . . Fluorescent layers
11/44 . . . Optical arrangements or shielding arrangements, e.g. filters, black matrices, light reflecting means or electromagnetic shielding means
11/46 . . Connecting or feeding means, e.g. leading-in conductors
11/48 . . Sealing, e.g. seals specially adapted for leading-in conductors
11/50 . . Filling, e.g. selection of gas mixture
11/52 . . Means for absorbing or adsorbing the gas mixture, e.g. by gettering
11/54 . . Means for exhausting the gas

13/00 Discharge tubes with liquid-pool cathodes, e.g. metal-vapour rectifying tubes

13/02 . Details
13/04 . . Main electrodes; Auxiliary anodes
13/06 . . . Cathodes
13/08 . . . . characterised by the material
13/10 . . . . Containers for the liquid pool; Arrangements or mounting thereof
13/12 . . . . Positioning or moving the cathode spot on the surface of the pool
13/14 . . . . Cooling, heating, circulating, filtering, or controlling level of the liquid
13/16 . . . Anodes; Auxiliary anodes for maintaining the discharge
13/18 . . . . Cooling or heating of anodes
13/20 . . Control electrodes, e.g. grid (for igniting arrangements H01J 13/34)
13/22 . . Screens, e.g. for preventing or eliminating arcing-back
13/24 . . Vessels; Containers
13/242 . . . {characterised by the material}
13/244 . . . {characterised by the shape}
13/246 . . . {Treatment of, or coating on interior parts of vessel}
13/248 . . . {Envelope means outside vessel, i.e. screens, reflectors, filters}
13/26 . . Seals between parts of vessels; Seals for leading-in conductors; Leading-in conductors
13/263 . . . {Leading-in conductors to the liquid electrode}
13/266 . . . {Leading-in conductors to the anode}
13/28 . . Selection of substances for gas filling; Means for obtaining the desired pressure within the tube
13/30 . . . Means for permitting pumping during operation of the tube
13/32 . . Cooling arrangements; Heating arrangements (for cathodes H01J 13/14; for anodes H01J 13/18)
13/34 . . Igniting arrangements
13/36 . . . having resistive or capacitative igniter
13/38 . . . . having resistive igniter only
13/40 . . . Igniting by movement of a solid electrode
13/405 . . . . {Interrupting contact with liquid cathode}
13/42 . . . Igniting by movement of vessel as a whole, e.g. tilting
13/44 . . Devices for preventing or eliminating arcing-back
13/46 . . One or more circuit elements structurally associated with the tube
13/48 . . Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for
13/50 . Tubes having a single main anode
13/52 . . with control by one or more intermediate control electrodes
13/54 . . with control by igniter, e.g. single-anode ignitron
13/56 . Tubes having two or more main anodes
13/58 . . with control by one or more intermediate control electrodes

15/00 Gas-filled discharge tubes with gaseous cathodes, e.g. plasma cathode

15/02 . Details, e.g. electrode, gas filling, shape of vessel
15/04 . . Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for

17/00 Gas-filled discharge tubes with solid cathode

(H01J 25/00, H01J 27/00, H01J 31/00 - H01J 41/00 {, H01J 11/00} take precedence; gas filled spark gaps H01T; Marx converters H02M 7/26)

17/005 . {specially adapted as noise generators (electronic circuits for generation of noise currents or voltages H03B 29/00)}
17/02 . Details
17/04 . . Electrodes; Screens
17/06 . . . Cathodes
17/063 . . . . {Indirectly heated cathodes, e.g. by the discharge itself}
17/066 . . . . {Cold cathodes}
17/08 . . . . having mercury or liquid alkali metal deposited on the cathode surface during operation of the tube
17/10 . . . Anodes
17/12 . . . Control electrodes
17/14 . . Magnetic means for controlling the discharge
17/16 . . Vessels; Containers
17/18 . . Seals between parts of vessels; Seals for leading-in conductors; Leading-in conductors
17/183 . . . {Seals between parts of vessel}
17/186 . . . {Seals between leading-in conductors and vessel}
17/20 . . Selection of substances for gas fillings; Specified operating pressures or temperatures
17/22 . . Means for obtaining or maintaining the desired pressure within the tube
17/24 . . . Means for absorbing or adsorbing gas, e.g. by gettering
17/26 . . . Means for producing, introducing, or replenishing gas or vapour during operation of the tube
17/28 . . Cooling arrangements
17/30 . . Igniting arrangements

17/32 . . . Igniting by associated radioactive materials or fillings
17/325 . . . . {Current stabilising tubes, e.g. curpistors}
17/34 . . One or more circuit elements structurally associated with the tube
17/36 . . Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for
17/38 . Cold-cathode tubes
17/40 . . with one cathode and one anode, e.g. glow tubes, tuning-indicator glow tubes, voltage-stabiliser tubes, voltage-indicator tubes, (cathode-glow lamps H01J 61/04)
17/42 . . . having one or more probe electrodes, e.g. for potential dividing
17/44 . . . having one or more control electrodes
17/46 . . . . for preventing and then permitting ignition but thereafter having no control
17/48 . . with more than one cathode or anode, e.g. sequence-discharge tube, counting tube, dekatron
17/485 . . . {Plasma addressed liquid crystal displays [PALC]}
17/49 . . . Display panels, e.g. with crossed electrodes {, e.g. making use of direct current (display panels making use of alternating current H01J 11/00)}
17/491 . . . . {with electrodes arranged side by side and substantially in the same plane, e.g. for displaying alphanumeric characters}
17/492 . . . . {with crossed electrodes}
17/494 . . . . . {using sequential transfer of the discharges, e.g. of the self-scan type (addressing circuits therefor G09G 3/29)}
17/495 . . . . . {display panels using sequential transfer of the discharge along dielectric storage elements}
17/497 . . . . . {for several colours}
17/498 . . . . {with a gas discharge space and a post acceleration space for electrons}
17/50 . Thermionic-cathode tubes
17/52 . . with one cathode and one anode
17/54 . . . having one or more control electrodes
17/56 . . . . for preventing and then permitting ignition, but thereafter having no control
17/58 . . with more than one cathode or anode
17/60 . . . the discharge paths priming each other in a predetermined sequence, e.g. counting tube
17/62 . . . with independent discharge paths controlled by intermediate electrodes, e.g. polyphase rectifier
17/64 . Tubes specially designed for switching or modulating in a waveguide, e.g. TR box

19/00 Details of vacuum tubes of the types covered by group H01J 21/00

19/02 . Electron-emitting electrodes; Cathodes
19/04 . . Thermionic cathodes
19/06 . . . characterised by the material
19/062 . . . . with alkaline-earth metal oxides, or such oxides used in conjunction with reducing agents, as an emissive material
19/064 . . . . with other metal oxides as an emissive material
19/066 . . . . with metals or alloys as an emissive material
19/068 . . . . with compounds having metallic conductive properties, e.g. lanthanum boride, as an emissive material
19/08 . . . Cathodes heated directly by an electric current
19/10 . . . characterised by the shape
19/12 . . . . Supports; Vibration-damping arrangements
19/14 . . . Cathodes heated indirectly by an electric current; Cathodes heated by electron or ion bombardment
19/16 . . . . Heaters
19/18 . . . . Insulating layer or body located between heater and emissive material
19/20 . . . . Supports for the emissive material
19/22 . . . . Dispenser-type cathodes, e.g. L-cathode
19/24 . . Cold cathodes, e.g. field-emissive cathode
19/28 . Non-electron-emitting electrodes; Screens
19/30 . . characterised by the material
19/32 . . Anodes
19/34 . . . forming part of the envelope
19/36 . . . Cooling of anodes
19/38 . . Control electrodes, e.g. grid
19/40 . . Screens for shielding
19/42 . Mounting, supporting, spacing, or insulating of electrodes or of electrode assemblies
19/44 . . Insulation between electrodes or supports within the vacuum space
19/46 . . Mountings for the electrode assembly as a whole
19/48 . . Mountings for individual electrodes
19/50 . . Spacing members extending to the envelope
19/52 . . . without fixed connection between spacing member and envelope
19/54 . Vessels; Containers; Shields associated therewith
19/56 . . characterised by the material of the vessel or container
19/57 . . provided with coatings on the walls thereof; Selection of materials for the coatings
19/58 . Seals between parts of vessels
19/60 . Seals for leading-in conductors
19/62 . Leading-in conductors
19/64 . Means forming part of the tube for the purpose supporting it
19/66 . Means forming part of the tube for the purpose of providing electrical connection to it {(H01J 5/46 - H01J 5/62 take precedence)}
19/68 . Specified gas introduced into the tube at low pressure, e.g. for reducing or influencing space charge
19/70 . Means for obtaining or maintaining the vacuum, e.g. by gettering
19/72 . . Tubulations therefor, e.g. for exhausting; Closures therefor
19/74 . Cooling arrangements (cooling of anodes H01J 19/36)
19/76 . Means structurally associated with the tube for indicating defects or previous use
19/78 . One or more circuit elements structurally associated with the tube
19/80 . . Structurally associated resonator having distributed inductance and capacitance
19/82 . Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for

21/00 **Vacuum tubes** (H01J 25/00, H01J 31/00 - H01J 40/00, H01J 43/00, H01J 47/00, H01J 49/00 take precedence; details of vacuum tubes H01J 19/00)

21/02 . Tubes with a single discharge path

21/04 . . without control means, i.e. diodes

21/06 . . having electrostatic control means only

21/065 . . . {Devices for short wave tubes}

21/08 . . . with movable electrode or electrodes

21/10 . . . with one or more immovable internal control electrodes, e.g. triode, pentode, octode

21/105 . . . . {with microengineered cathode and control electrodes, e.g. Spindt-type}

21/12 . . . . Tubes with variable amplification factor

21/14 . . . . Tubes with means for concentrating the electron stream, e.g. beam tetrode

21/16 . . . with external electrostatic control means and with or without internal control electrodes

21/18 . . having magnetic control means; having both magnetic and electrostatic control means

21/20 . Tubes with more than one discharge path; Multiple tubes, e.g. double diode, triode-hexode

21/22 . . with movable electrode or electrodes

21/24 . . with variable amplification factor

21/26 . . with means for concentrating the electron stream

21/34 . Tubes with electrode system arranged or dimensioned so as to eliminate transit-time effect (with flat electrodes H01J 21/36)

21/36 . Tubes with flat electrodes, e.g. disc electrode

23/00 **Details of transit-time tubes of the types covered by group H01J 25/00**

23/005 . {Cooling methods or arrangements (H01J 23/033 takes precedence)}

23/02 . Electrodes; Magnetic control means; Screens (associated with resonator or delay system H01J 23/16)

23/027 . . Collectors

23/0275 . . . {Multistage collectors}

23/033 . . . Collector cooling devices

23/04 . . Cathodes

23/05 . . . having a cylindrical emissive surface, e.g. cathodes for magnetrons

23/06 . . Electron or ion guns

23/065 . . . producing a solid cylindrical beam (H01J 23/075 takes precedence)

23/07 . . . producing a hollow cylindrical beam (H01J 23/075 takes precedence)

23/075 . . . Magnetron injection guns

23/08 . . Focusing arrangements, e.g. for concentrating stream of electrons, for preventing spreading of stream

23/083 . . . Electrostatic focusing arrangements

23/087 . . . Magnetic focusing arrangements

23/0873 . . . . {with at least one axial-field reversal along the interaction space, e.g. P.P.M. focusing}

23/0876 . . . . {with arrangements improving the linearity and homogeniety of the axial field, e.g. field straightener}

23/09 . . Electric systems for directing or deflecting the discharge along a desired path, e.g. E-type (focusing arrangements H01J 23/08)

23/10 . . Magnet systems for directing or deflecting the discharge along a desired path, e.g. a spiral path (magnetic focusing arrangements H01J 23/08)

23/11 . . Means for reducing noise (in electron or ion gun H01J 23/06)

23/12 . Vessels; Containers

23/14 . Leading-in arrangements; Seals therefor

23/15 . . Means for preventing wave energy leakage structurally associated with tube leading-in arrangements, e.g. filters, chokes, attenuating devices

23/16 . Circuit elements, having distributed capacitance and inductance, structurally associated with the tube and interacting with the discharge

23/165 . . {Manufacturing processes or apparatus therefore}

23/18 . . Resonators

23/20 . . . Cavity resonators; Adjustment or tuning thereof

23/207 . . . . Tuning of single resonator

23/213 . . . . Simultaneous tuning of more than one resonator, e.g. resonant cavities of a magnetron

23/22 . . . Connections between resonators, e.g. strapping for connecting resonators of a magnetron

23/24 . . Slow-wave structures {, e.g. delay systems}

23/26 . . . Helical slow-wave structures; Adjustment therefor

23/27 . . . . Helix-derived slow-wave structures

23/28 . . . Interdigital slow-wave structures; Adjustment therefor

23/30 . . . Damping arrangements associated with slow-wave structures, e.g. for suppression of unwanted oscillations

23/34 . Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for

23/36 . Coupling devices having distributed capacitance and inductance, structurally associated with the tube, for introducing or removing wave energy

23/38 . . to or from the discharge

23/40 . . to or from the interaction circuit

23/42 . . . the interaction circuit being a helix or a helix-derived slow-wave structure (H01J 23/44 - H01J 23/48 take precedence)

23/44 . . . Rod-type coupling devices (H01J 23/46, H01J 23/48, H01J 23/54 take precedence)

23/46 . . . Loop coupling devices

23/48 . . . for linking interaction circuit with coaxial lines; Devices of the coupled helices type (H01J 23/46 takes precedence)

23/50 . . . . the interaction circuit being a helix or derived from a helix (H01J 23/52 takes precedence)

23/52 . . . . the coupled helices being disposed coaxially around one another

23/54 . . Filtering devices preventing unwanted frequencies or modes to be coupled to, or out of, the interaction circuit; Prevention of high frequency leakage in the environment

25/00 **Transit-time tubes, e.g. klystrons, travelling-wave tubes, magnetrons** (details of transit-time tubes H01J 23/00; particle accelerators H05H)

25/005 . {Gas-filled transit-time tubes}

25/02 . Tubes with electron stream modulated in velocity or density in a modulator zone and thereafter giving up energy in an inducing zone, the zones being associated with one or more resonators
25/025 . . {with an electron stream following a helical path}
25/04 . . Tubes having one or more resonators, without reflection of the electron stream, and in which the modulation produced in the modulator zone is mainly density modulation, e.g. Heaff tube
25/06 . . Tubes having only one resonator, without reflection of the electron stream, and in which the modulation produced in the modulator zone is mainly velocity modulation, e.g. Lüdi-Klystron
25/08 . . . with electron stream perpendicular to the axis of the resonator
25/10 . . Klystrons, i.e. tubes having two or more resonators, without reflection of the electron stream, and in which the stream is modulated mainly by velocity in the zone of the input resonator
25/11 . . . Extended interaction klystrons
25/12 . . . with pencil-like electron stream in the axis of the resonators
25/14 . . . with tube-like electron stream coaxial with the axis of the resonators
25/16 . . . with pencil-like electron stream perpendicular to the axis of the resonators
25/18 . . . with radial or disc-like electron stream perpendicular to the axis of the resonators
25/20 . . . having special arrangements in the space between resonators, e.g. resistive-wall amplifier tube, space-charge amplifier tube, velocity-jump tube
25/22 . . Reflex klystrons, i.e. tubes having one or more resonators, with a single reflection of the electron stream, and in which the stream is modulated mainly by velocity in the modulator zone
25/24 . . . in which the electron stream is in the axis of the resonator or resonators and is pencil-like before reflection
25/26 . . . in which the electron stream is coaxial with the axis of the resonator or resonators and is tube-like before reflection
25/28 . . . in which the electron stream is perpendicular to the axis of the resonator or resonators and is pencil-like before reflection
25/30 . . . in which the electron stream is perpendicular to the axis of the resonator or resonators and is radial or disc-like before reflection
25/32 . . Tubes with plural reflection, e.g. Coeterier tube
25/34 . Travelling-wave tubes; Tubes in which a travelling wave is simulated at spaced gaps
25/36 . . Tubes in which an electron stream interacts with a wave travelling along a delay line or equivalent sequence of impedance elements, and without magnet system producing an H-field crossing the E-field
25/38 . . . the forward travelling wave being utilised
25/40 . . . the backward travelling wave being utilised
25/42 . . Tubes in which an electron stream interacts with a wave travelling along a delay line or equivalent sequence of impedance elements, and with a magnet system producing an H-field crossing the E-field (with travelling wave moving completely around the electron space H01J 25/50)
25/44 . . . the forward travelling wave being utilised
25/46 . . . the backward travelling wave being utilised
25/48 . . Tubes in which two electron streams of different velocities interact with one another, e.g. electron-wave tube
25/49 . . Tubes using the parametric principle, e.g. for parametric amplification
25/50 . Magnetrons, i.e. tubes with a magnet system producing an H-field crossing the E-field (with travelling wave not moving completely around the electron space H01J 25/42; functioning with plural reflection or with reversed cyclotron action H01J 25/62, H01J 25/64)
25/52 . . with an electron space having a shape that does not prevent any electron from moving completely around the cathode or guide electrode
25/54 . . . having only one cavity or other resonator, e.g. neutrode tubes
25/55 . . . . Coaxial cavity magnetrons
25/56 . . . . with interdigital arrangements of anodes, e.g. turbator tube
25/58 . . . having a number of resonators; having a composite resonator, e.g. a helix
25/587 . . . . Multi-cavity magnetrons
25/593 . . . . . Rising-sun magnetrons
25/60 . . with an electron space having a shape that prevents any electron from moving completely around the cathode or guide electrode; Linear magnetrons
25/61 . Hybrid tubes, i.e. tubes comprising a klystron section and a travelling-wave section
25/62 . Strophotrons, i.e. tubes with H-field crossing the E-field and functioning with plural reflection
25/64 . Turbine tubes, i.e. tubes with H-field crossing the E-field and functioning with reversed cyclotron action
25/66 . Tubes with electron stream crossing itself and thereby interacting or interfering with itself
25/68 . Tubes specially designed to act as oscillator with positive grid and retarding field, e.g. for Barkhausen-Kurz oscillators (with secondary emission H01J 25/76)
25/70 . . with resonator having distributed inductance with capacitance, e.g. Pintsch tube
25/72 . . in which a standing wave or a considerable part thereof is produced along an electrode, e.g. Clavier tube (with resonator having distributed inductance and capacitance H01J 25/70)
25/74 . Tubes specially designed to act as transit-time diode oscillators, e.g. monotrons
25/76 . Dynamic electron-multiplier tubes, e.g. Farnsworth multiplier tube, multipactor
25/78 . Tubes with electron stream modulated by deflection in a resonator

27/00 **Ion beam tubes** (H01J 25/00, H01J 33/00, H01J 37/00 take precedence; particle accelerators H05H)
27/02 . Ion sources; Ion guns {(for examination or processing discharge tubes H01J 37/08; ion sources, ion guns for particle spectrometer or separator tubes H01J 49/10; ion propulsion F03H 1/00)}
27/022 . . {Details}
27/024 . . . {Extraction optics, e.g. grids}
27/026 . . {Cluster ion sources}
27/028 . . {Negative ion sources}

27/04 . . using reflex discharge, e.g. Penning ion sources {(electron bombardment ion sources H01J 27/08)}
27/06 . . . without applied magnetic field
27/08 . . using arc discharge
27/10 . . . Duoplasmatrons {; Duopigatrons}
27/12 . . . . provided with an expansion cup
27/14 . . . Other arc discharge ion sources using an applied magnetic field
27/143 . . . . {Hall-effect ion sources with closed electron drift}
27/146 . . . . {End-Hall type ion sources, wherein the magnetic field confines the electrons in a central cylinder}
27/16 . . using high-frequency excitation, e.g. microwave excitation
27/18 . . . with an applied axial magnetic field
27/20 . . using particle {beam} bombardment, e.g. ionisers
27/205 . . . {with electrons, e.g. electron impact ionisation, electron attachment}
27/22 . . . Metal ion sources
27/24 . . using photo-ionisation, e.g. using laser beam
27/26 . . using surface ionisation, e.g. field effect ion sources, thermionic ion sources (H01J 27/20, H01J 27/24 take precedence)

29/00 Details of cathode-ray tubes or of electron-beam tubes of the types covered by group H01J 31/00

29/003 . {Arrangements for eliminating unwanted electromagnetic effects, e.g. demagnetisation arrangements, shielding coils (H01J 29/06, H01J 29/867 take precedence; demagnetisation in general H01F 13/00; circuit arrangements therefor H04N 9/29; screening of apparatus against electric or magnetic fields H05K 9/00)}
29/006 . {Arrangements for eliminating unwanted temperature effects}
29/02 . Electrodes; Screens; Mounting, supporting, spacing or insulating thereof
29/021 . . {arrangements for eliminating interferences in the tube (H01J 29/484 takes precedence)}
29/023 . . {secondary-electron emitting electrode arrangements (secondary-emission tubes H01J 43/00)}
29/025 . . {Mounting or supporting arrangements for grids (H01J 29/028 takes precedence)}
29/026 . . {Mounting or supporting arrangements for charge storage screens not deposited on the frontplate}
29/028 . . {Mounting or supporting arrangements for flat panel cathode ray tubes, e.g. spacers particularly relating to electrodes}
29/04 . . Cathodes
29/06 . . Screens for shielding; Masks interposed in the electron stream
29/07 . . . Shadow masks for colour television tubes
29/073 . . . . {Mounting arrangements associated with shadow masks}
29/076 . . . . {characterised by the shape or distribution of beam-passing apertures}
29/08 . . Electrodes intimately associated with a screen on or from which an image or pattern is formed, picked-up, converted or stored, e.g. backing-plates for storage tubes or collecting secondary electrons
29/085 . . . {Anode plates, e.g. for screens of flat panel displays}
29/10 . . Screens on or from which an image or pattern is formed, picked up, converted or stored
29/12 . . . acting as light valves by shutter operation, e.g. for eidophor
29/14 . . . acting by discoloration, e.g. halide screen
29/16 . . . Incandescent screens
29/18 . . . Luminescent screens
29/182 . . . . {acting upon the lighting-up of the luminescent material other than by the composition of the luminescent material, e.g. by infra red or UV radiation, heating or electric fields}
29/185 . . . . {measures against halo-phenomena}
29/187 . . . . {screens with more than one luminescent material (as mixtures for the treatment of the screens) (for several superimposed luminescent layers H01J 29/26; for adjacent dots or lines of different luminescent material H01J 29/32)}
29/20 . . . . characterised by the luminescent material
29/22 . . . . characterised by the binder or adhesive for securing the luminescent material to its support, e.g. vessel
29/225 . . . . . {photosensitive adhesive}
29/24 . . . . Supports for luminescent material
29/26 . . . . with superimposed luminescent layers
29/28 . . . . with protective, conductive or reflective layers
29/30 . . . . with luminescent material discontinuously arranged, e.g. in dots, in lines
29/32 . . . . . with adjacent dots or lines of different luminescent material, e.g. for colour television
29/322 . . . . . {with adjacent dots}
29/325 . . . . . {with adjacent lines}
29/327 . . . . . {Black matrix materials}
29/34 . . . . provided with permanent marks or references
29/36 . . . Photoelectric screens; Charge-storage screens
29/38 . . . . not using charge storage, e.g. photo-emissive screen, extended cathode {(electrodes using photo-emission in general H01J 1/34)}
29/385 . . . . . {Photocathodes comprising a layer which modified the wave length of impinging radiation}
29/39 . . . . Charge-storage screens
29/395 . . . . . {charge-storage grids exhibiting triode effect}
29/41 . . . . . using secondary emission, e.g. for supericonoscope {(electrodes using secondary emission in general H01J 1/32; secondary emission tubes H01J 43/00)}
29/413 . . . . . {for writing and reading of charge pattern on opposite sides of the target, e.g. for superorthicon}
29/416 . . . . . {with a matrix of electrical conductors traversing the target}
29/43 . . . . . using photo-emissive mosaic, e.g. for orthicon, for iconoscope
29/435 . . . . . {with a matrix of conductors traversing the target}

29/44 . . . . . exhibiting internal electric effects caused by particle radiation, e.g. bombardment-induced conductivity {(particle detectors exhibiting internal electric effects G01T 1/26)}

29/45 . . . . . exhibiting internal electric effects caused by electromagnetic radiation, e.g. photoconductive screen, photodielectric screen, photovoltaic screen {(photoconductive layers for electrography G03G 5/00)}

29/451 . . . . . {with photosensitive junctions}

29/453 . . . . . {provided with diode arrays}

29/455 . . . . . {formed on a silicon substrate}

29/456 . . . . . {exhibiting no discontinuities, e.g. consisting of uniform layers}

29/458 . . . . . {pyroelectrical targets; targets for infrared or ultraviolet or X-ray radiations}

29/46 . Arrangements of electrodes and associated parts for generating or controlling the ray or beam, e.g. electron-optical arrangement {(transit time tubes H01J 23/00, H01J 25/00; X-ray tubes H01J 35/00; beam tubes for examining ions, e.g. electron or ion microscopes, or processing of objects or materials, e.g. electron or ion beam tubes H01J 37/04; electron multipliers H01J 43/04; handling of radiation or particles, e.g. focusing, deviating, not otherwise provided for G21K 1/00)}

NOTE

H01J 29/48 takes precedence over groups H01J 29/52 - H01J 29/58.

29/462 . . {arrangements for interrupting the beam during inoperative periods}

29/465 . . {for simultaneous focalisation and deflection of ray or beam}

29/467 . . {Control electrodes for flat display tubes, e.g. of the type covered by group H01J 31/123}

29/48 . . Electron guns

29/481 . . . {Electron guns using field-emission, photo-emission, or secondary-emission electron source}

29/482 . . . {Electron guns using electron multiplication}

29/484 . . . {Eliminating deleterious effects due to thermal effects, electrical or magnetic fields; Preventing unwanted emission (H01J 29/481 and H01J 29/482 take precedence)}

29/485 . . . {Construction of the gun or of parts thereof (H01J 29/481, H01J 29/482, H01J 29/484 and H01J 29/487 take precedence)}

29/487 . . . {Replacing parts of the gun; Relative adjustment of the electrodes (H01J 29/481 and H01J 29/482 take precedence; vacuum locks H01J 29/865)}

29/488 . . . {Schematic arrangements of the electrodes for beam forming; Place and form of the elecrodes}

29/50 . . . two or more guns in a single vacuum space, e.g. for plural-ray tube (H01J 29/51 takes precedence)

29/503 . . . . {Three or more guns, the axes of which lay in a common plane}

29/506 . . . . {guns in delta or circular configuration}

29/51 . . . Arrangements for controlling convergence of a plurality of beams {by means of electric field only}

29/52 . . Arrangements for controlling intensity of ray or beam, e.g. for modulation {(H01J 29/467 takes precedence)}

29/525 . . . {Digitally controlled systems, e.g. Digisplay}

29/54 . . Arrangements for centring ray or beam {(H01J 29/467 takes precedence)}

29/56 . . Arrangements for controlling cross-section of ray or beam; Arrangements for correcting aberration of beam, e.g. due to lenses {(H01J 29/467 takes precedence)}

29/563 . . . {for controlling cross-section}

29/566 . . . {for correcting aberration}

29/58 . . Arrangements for focusing or reflecting ray or beam

29/585 . . . {in which the transit time of the electrons has to be taken into account}

29/60 . . . Mirrors

29/62 . . . Electrostatic lenses

29/622 . . . . {producing fields exhibiting symmetry of revolution}

29/624 . . . . . {co-operating with or closely associated to an electron gun}

29/626 . . . . {producing fields exhibiting periodic axial symmetry, e.g. multipolar fields}

29/628 . . . . . {co-operating with or closely associated to an electron gun}

29/64 . . . Magnetic lenses

29/66 . . . . using electromagnetic means only

29/68 . . . . using permanent magnets only

29/70 . . Arrangements for deflecting ray or beam {(H01J 29/467, H01J 29/525 take precedence)}

29/701 . . . {Systems for correcting deviation or convergence of a plurality of beams by means of magnetic fields at least}

29/702 . . . . {Convergence correction arrangements therefor}

29/703 . . . . . {Static convergence systems}

29/705 . . . . . {Dynamic convergence systems}

29/706 . . . . {Deviation correction devices, i.e. having the same action on each beam}

29/707 . . . . {Arrangements intimately associated with parts of the gun and co-operating with external magnetic excitation devices}

29/708 . . . {in which the transit time of the electrons has to be taken into account}

29/72 . . . along one straight line or along two perpendicular straight lines

29/74 . . . . Deflecting by electric fields only

29/76 . . . . Deflecting by magnetic fields only

29/762 . . . . . {using saddle coils or printed windings (coils per se H01F)}

29/764 . . . . . {using toroidal windings}

29/766 . . . . . {using a combination of saddle coils and toroidal windings}

29/768 . . . . . {using printed windings (printed windings in general H01F 27/2804; manufacturing printed coils per se H01F 41/04; printed circuits and apparatus or processes for manufacturing printed circuits in general H05K 1/00, e.g. H05K 1/16, and H05K 3/00)}

29/78 . . . along a circle, spiral or rotating radial line, e.g. for radar display

29/80 . . Arrangements for controlling the ray or beam after passing the main deflection system, e.g. for post-acceleration or post-concentration, for colour switching {(H01J 29/701 takes precedence)}

29/803 . . . {for post-acceleration or post-deflection, e.g. for colour switching}

29/806 . . . . {Electron lens mosaics, e.g. fly's eye lenses, colour selection lenses}

29/81 . . . using shadow masks

29/82 . . Mounting, supporting, spacing, or insulating electron-optical or ion-optical arrangements

29/823 . . . {around the neck of the tube}

29/826 . . . . {Deflection arrangements}

29/84 . Arrangements for removing or diverting unwanted particles, e.g. for negative ions or fringing electrons; Arrangements for velocity or mass selection

29/845 . . {by means of magnetic systems}

29/86 . Vessels; Containers; Vacuum locks

29/861 . . {Vessels or containers characterised by the form or the structure thereof}

29/862 . . . {of flat panel cathode ray tubes}

29/863 . . {Vessels or containers characterised by the material thereof}

29/864 . . {Spacers between faceplate and backplate of flat panel cathode ray tubes}

29/865 . . {Vacuum locks}

29/866 . . . {Devices for introducing a recording support into the vessel}

29/867 . . {Means associated with the outside of the vessel for shielding, e.g. magnetic shields (screens for shielding inside the vessel H01J 29/06; magnetic shielding in general H05K 9/00)}

29/868 . . . {Screens covering the input or output face of the vessel, e.g. transparent anti-static coatings, X-ray absorbing layers}

29/87 . . Arrangements for preventing or limiting effects of implosion of vessels or containers

29/88 . . provided with coatings on the walls thereof; Selection of materials for the coatings {(H01J 29/868 and H01J 29/89 take precedence)}

29/89 . . Optical or photographic arrangements structurally combined {or co-operating} with the vessel {(H01J 29/866 and H01J 29/868 take precedence)}

29/892 . . . {using fibre optics}

29/894 . . . {Arrangements combined with the vessel for the purpose of image projection on a screen (projection arrangements for image reproduction, e.g. using eidophor H04N 5/74)}

29/896 . . . {Anti-reflection means, e.g. eliminating glare due to ambient light}

29/898 . . . {Spectral filters}

29/90 . Leading-in arrangements; Seals therefor

29/92 . Means forming part of the tube for the purpose of providing electrical connection to it

29/925 . . {High voltage anode feedthrough connectors for display tubes}

29/94 . Selection of substances for gas fillings; Means for obtaining or maintaining the desired pressure within the tube, e.g. by gettering {(exhausting, degassing, gettering of electric discharge tubes in general H01J 9/38)}

29/96 . One or more circuit elements structurally associated with the tube

29/98 . Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for

31/00 Cathode ray tubes; Electron beam tubes (H01J 25/00, H01J 33/00, H01J 35/00, H01J 37/00 take precedence; details of cathode ray tubes or of electron beam tubes H01J 29/00)

31/02 . having one or more output electrodes which may be impacted selectively by the ray or beam, and onto, from, or over which the ray or beam may be deflected or de-focused {(pulse counting circuits therewith H03K 29/06)}

31/04 . . with only one or two output electrodes {with only two electrically independant groups or electrodes}

31/06 . . with more than two output electrodes, e.g. for multiple switching or counting

31/065 . . . {for electrography or electrophotography, for transferring a charge pattern through the faceplate (leading-in arrangements H01J 29/90; Lenard tubes H01J 33/00; electrography or electrophotography per se G03C)}

31/08 . having a screen on or from which an image or pattern is formed, picked up, converted, or stored

31/10 . . Image or pattern display tubes, i.e. having electrical input and optical output; Flying-spot tubes for scanning purposes

31/12 . . . with luminescent screen

31/121 . . . . {tubes for oscillography (colour display tubes H01J 31/20; cathode ray oscillography G01R 13/20)}

31/122 . . . . {Direct viewing storage tubes without storage grid (with storage grid H01J 31/18)}

31/123 . . . . {Flat display tubes}

31/124 . . . . . {using electron beam scanning}

31/125 . . . . . {provided with control means permitting the electron beam to reach selected parts of the screen, e.g. digital selection}

31/126 . . . . . {using line sources}

31/127 . . . . . {using large area or array sources, i.e. essentially a source for each pixel group}

31/128 . . . . {provided with control means permitting the electron beam to reach selected parts of the screen, e.g. digitally controlled display tubes (H01J 31/123 takes precedence)}

31/14 . . . . Magic-eye or analogous tuning indicators {(mounting of visual indicators in a radio set H03J 1/04; circuits for timing indicators H03J 3/14)}

31/15 . . . . with ray or beam selectively directed to luminescent anode segments {(printing by application of radiation B41J 2/447)}

31/16 . . . . with mask carrying a number of selectively displayable signs, e.g. charactron, numeroscope {(tubes with a mask carrying a matrix of openings, a selection of which permits a sign to be displayed H01J 31/128)}

31/18 . . . . with image written by a ray or beam on a grid-like charge-accumulating screen, and with a ray or beam passing through and influenced by this screen before striking the luminescent screen, e.g. direct-view storage tube {(charge storage grids exhibiting triode effect H01J 29/395)}

31/20 . . . for displaying images or patterns in two or more colours {(circuits for colour television H04N 9/16 - H04N 9/28)}

31/201 . . . . {using a colour-selection electrode}

31/203 . . . . . {with more than one electron beam}

31/205 . . . . . . {with three electron beams in delta configuration}

31/206 . . . . . . {with three coplanar electron beams}

31/208 . . . . {using variable penetration depth of the electron beam in the luminescent layer, e.g. penetrons}

31/22 . . . for stereoscopic displays

31/24 . . . with screen acting as light valve by shutter operation, e.g. eidophor {(projection arrangements for image reproduction, e.g. using eidophor H04N 5/74)}

31/26 . . Image pick-up tubes having an input of visible light and electric output (tubes without defined electron beams and having a light ray scanning photo-emissive screen H01J 40/20)

31/265 . . . {with light spot scanning}

31/28 . . . with electron ray scanning the image screen

31/283 . . . . {with a target comprising semiconductor junctions}

31/286 . . . . {correlater tubes}

31/30 . . . . having regulation of screen potential at anode potential, e.g. iconoscope

31/32 . . . . . Tubes with image amplification section, e.g. image-iconoscope, supericonoscope

31/34 . . . . having regulation of screen potential at cathode potential, e.g. orthicon

31/36 . . . . . Tubes with image amplification section, e.g. image-orthicon

31/38 . . . . . Tubes with photoconductive screen, e.g. vidicon

31/40 . . . . having grid-like image screen through which the electron ray passes and by which the ray is influenced before striking the output electrode, i.e. having "triode action"

31/42 . . . with image screen generating a composite electron beam which is deflected as a whole past a stationary probe to simulate a scanning effect, e.g. Farnsworth pick-up tube

31/44 . . . . Tubes with image amplification section

31/46 . . . Tubes in which electrical output represents both intensity and colour of image {(colour television cameras with only one tube H04N 23/12)}

31/48 . . . Tubes with amplification of output effected by electron multiplier arrangements within the vacuum space

31/49 . . Pick-up adapted for an input of electromagnetic radiation other than visible light and having an electric output, e.g. for an input of X-rays, for an input of infrared radiation

31/495 . . Pick-up tubes adapted for an input of sonic, ultrasonic or mechanical vibrations and having an electric output

31/50 . . Image-conversion or image-amplification tubes, i.e. having optical, X-ray, or analogous input, and optical output

31/501 . . . {with an electrostatic electron optic system (H01J 31/52 - H01J 31/56 take precedence)}

31/502 . . . . {with means to interrupt the beam, e.g. shutter for high speed photography (circuits using electron-beam shutters G03B 27/725)}

31/503 . . . {with an electromagnetic electron-optic system (H01J 31/52 - H01J 31/56 take precedence)}

31/505 . . . {flat tubes, e.g. proximity focusing tubes}

31/506 . . . {tubes using secondary emission effect}

31/507 . . . . {using a large number of channels, e.g. microchannel plates}

31/508 . . . {Multistage converters}

31/52 . . . having grid-like image screen through which the electron ray or beam passes and by which the ray or beam is influenced before striking the luminescent output screen, i.e. having "triode action"

31/54 . . . in which the electron ray or beam is reflected by the image input screen on to the image output screen

31/56 . . . for converting or amplifying images in two or more colours

31/58 . . Tubes for storage of image or information pattern or for conversion of definition of television or like images, i.e. having electrical input and electrical output {(electrostatic memories using electron beam tubes G11C 11/23)}

31/585 . . . {Monoscopes (H01J 31/60 takes precedence)}

31/60 . . . having means for deflecting, either selectively or sequentially, an electron ray on to separate surface elements of the screen (by circuitry alone H01J 29/08)

31/62 . . . . with separate reading and writing rays

31/64 . . . . . on opposite sides of screen, e.g. for conversion of definition

31/66 . . . having means for allowing all but selected cross-section elements of a homogeneous electron beam to reach corresponding elements of the screen, e.g. selectron

31/68 . . . in which the information pattern represents two or more colours

33/00 Discharge tubes with provision for emergence of electrons or ions from the vessel ({irradiation devices G21K} ; particle accelerators H05H)**; Lenard tubes**

33/02 . Details {(vessels for operation at high tension H01J 5/06)}

33/04 . . Windows

35/00 X-ray tubes

35/02 . Details

35/025 . . {X-ray tubes with structurally associated circuit elements}

35/04 . . Electrodes {; Mutual position thereof; Constructional adaptations therefor}

35/045 . . . {Electrodes for controlling the current of the cathode ray, e.g. control grids}

35/06 . . . Cathodes

35/064 . . . . {Details of the emitter, e.g. material or structure (H01J 35/065 takes precedence)}

35/065 . . . . {Field emission, photo emission or secondary emission cathodes}
35/066 . . . . {Details of electron optical components, e.g. cathode cups}
35/08 . . . Anodes; Anti cathodes
35/10 . . . . Rotary anodes; Arrangements for rotating anodes; Cooling rotary anodes
35/101 . . . . . {Arrangements for rotating anodes, e.g. supporting means, means for greasing, means for sealing the axle or means for shielding or protecting the driving}
35/1017 . . . . . {Bearings for rotating anodes}
35/1024 . . . . . {Rolling bearings}
35/103 . . . . . {Magnetic bearings}
35/104 . . . . . {Fluid bearings}
35/105 . . . . . {Cooling of rotating anodes, e.g. heat emitting layers or structures}
35/106 . . . . . {Active cooling, e.g. fluid flow, heat pipes}
35/107 . . . . . {Cooling of the bearing assemblies}
35/108 . . . . . {Substrates for and bonding of emissive target, e.g. composite structures}
35/112 . . . . {Non-rotating anodes (H01J 35/12 takes precedence)}
35/116 . . . . . {Transmissive anodes (acting as a window H01J 35/186)}
35/12 . . . . Cooling non-rotary anodes
35/13 . . . . . {Active cooling, e.g. fluid flow, heat pipes}
35/14 . . Arrangements for concentrating, focusing, or directing the cathode ray
35/147 . . . {Spot size control}
35/153 . . . {Spot position control}
35/16 . . Vessels; Containers; Shields associated therewith
35/165 . . . {joining connectors to the tube}
35/18 . . . Windows
35/186 . . . . {used as targets or X-ray converters}
35/20 . . Selection of substances for gas fillings; Means for obtaining or maintaining the desired pressure within the tube, e.g. by gettering
35/22 . specially designed for passing a very high current for a very short time, e.g. for flash operation
35/24 . Tubes wherein the point of impact of the cathode ray on the anode or anticathode is movable relative to the surface thereof
35/26 . . by rotation of the anode or anticathode
35/28 . . by vibration, oscillation, reciprocation, or swash-plate motion of the anode or anticathode
35/30 . . by deflection of the cathode ray
35/305 . . . {by using a rotating X-ray tube in conjunction therewith}
35/32 . Tubes wherein the X-rays are produced at or near the end of the tube or a part thereof which tube or part has a small cross-section to facilitate introduction into a small hole or cavity

37/00 Discharge tubes with provision for introducing objects or material to be exposed to the discharge, e.g. for the purpose of examination or processing thereof (H01J 33/00, H01J 40/00, H01J 41/00, H01J 47/00, H01J 49/00 take precedence)

37/02 . Details
37/023 . . {Means for mechanically adjusting components not otherwise provided for}
37/026 . . {Means for avoiding or neutralising unwanted electrical charges on tube components}
37/04 . . Arrangements of electrodes and associated parts for generating or controlling the discharge, e.g. electron-optical arrangement or ion-optical arrangement {(H01J 37/32009, H01J 37/32623, H01J 37/3266, H01J 37/32697 take precedence; electron or ion-optical systems for localised treatment of objects H01J 37/3007)}
37/045 . . . {Beam blanking or chopping, i.e. arrangements for momentarily interrupting exposure to the discharge}
37/05 . . . Electron or ion-optical arrangements for separating electrons or ions according to their energy {or mass}(particle separator tubes H01J 49/00)
37/06 . . . Electron sources; Electron guns
37/061 . . . . {Electron guns using electron multiplication}
37/063 . . . . Geometrical arrangement of electrodes for beam-forming
37/065 . . . . Construction of guns or parts thereof (H01J 37/067 - H01J 37/077 take precedence)
37/067 . . . . Replacing parts of guns; Mutual adjustment of electrodes (H01J 37/073 - H01J 37/077 take precedence; vacuum locks H01J 37/18)
37/07 . . . . Eliminating deleterious effects due to thermal effects or electric or magnetic fields (H01J 37/073 - H01J 37/077 take precedence)
37/073 . . . . Electron guns using field emission, photo emission, or secondary emission electron sources
37/075 . . . . Electron guns using thermionic emission from cathodes heated by particle bombardment or by irradiation, e.g. by laser
37/077 . . . . Electron guns using discharge in gases or vapours as electron sources
37/08 . . . Ion sources; Ion guns
37/09 . . . Diaphragms; Shields associated with electron or ion-optical arrangements; Compensation of disturbing fields
37/10 . . . Lenses
37/12 . . . . electrostatic
37/14 . . . . magnetic
37/141 . . . . . Electromagnetic lenses
37/1413 . . . . . {Means for interchanging parts of the lens, e. g. pole pieces within the tube}
37/1416 . . . . . {with superconducting coils}
37/143 . . . . . Permanent magnetic lenses
37/145 . . . . Combinations of electrostatic and magnetic lenses
37/147 . . . Arrangements for directing or deflecting the discharge along a desired path ({H01J 37/045 take precedence;} lenses H01J 37/10)
37/1471 . . . . {for centering, aligning or positioning of ray or beam}
37/1472 . . . . {Deflecting along given lines}
37/1474 . . . . . {Scanning means}
37/1475 . . . . . {magnetic}
37/1477 . . . . . {electrostatic}
37/1478 . . . . {Beam tilting means, i.e. for stereoscopy or for beam channelling}

37/15 . . . . External mechanical adjustment of electron or ion optical components (H01J 37/067, H01J 37/20 take precedence)
37/153 . . . Electron-optical or ion-optical arrangements for the correction of image defects, e.g. stigmators
37/16 . . Vessels; Containers
37/165 . . . {Means associated with the vessel for preventing the generation of or for shielding unwanted radiation, e.g. X-rays}
37/18 . . Vacuum locks {; Means for obtaining or maintaining the desired pressure within the vessel}
37/185 . . . {Means for transferring objects between different enclosures of different pressure or atmosphere}
37/20 . . Means for supporting or positioning the object or the material; Means for adjusting diaphragms or lenses associated with the support
37/21 . . Means for adjusting the focus
37/22 . . Optical {, image processing} or photographic arrangements associated with the tube
37/222 . . . {Image processing arrangements associated with the tube}
37/224 . . . {Luminescent screens or photographic plates for imaging; Apparatus specially adapted therefor, e. g. cameras, TV-cameras, photographic equipment or exposure control; Optical subsystems specially adapted therefor, e. g. microscopes for observing image on luminescent screen}
37/226 . . . {Optical arrangements for illuminating the object; optical arrangements for collecting light from the object}
37/228 . . . . {whereby illumination or light collection take place in the same area of the discharge}
37/24 . . Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for
37/241 . . . {High voltage power supply or regulation circuits}
37/242 . . . {Filament heating power supply or regulation circuits (H01J 37/241 takes precedence)}
37/243 . . . {Beam current control or regulation circuits (H01J 37/241 takes precedence)}
37/244 . . Detectors; Associated components or circuits therefor
37/248 . . Components associated with high voltage supply
37/252 . Tubes for spot-analysing by electron or ion beams; Microanalysers
37/256 . . using scanning beams
37/26 . Electron or ion microscopes; Electron or ion diffraction tubes
37/261 . . {Details}
37/263 . . . {Contrast, resolution or power of penetration}
37/265 . . . {Controlling the tube; circuit arrangements adapted to a particular application not otherwise provided, e.g. bright-field-dark-field illumination}
37/266 . . {Measurement of magnetic or electric fields in the object; Lorentzmicroscopy (spot analysing H01J 37/252; emission microscopes H01J 37/285; reflecting microscopes H01J 37/29)}
37/268 . . . {with scanning beams}
37/27 . . Shadow microscopy
37/28 . . with scanning beams {(H01J 37/268, H01J 37/292, H01J 37/2955 take precedence)}
37/285 . . Emission microscopes, e.g. field-emission microscopes
37/29 . . Reflection microscopes
37/292 . . . {using scanning ray}
37/295 . . Electron or ion diffraction tubes
37/2955 . . . {using scanning ray}
37/30 . Electron-beam or ion-beam tubes for localised treatment of objects
37/3002 . . {Details}
37/3005 . . . {Observing the objects or the point of impact on the object}
37/3007 . . . {Electron or ion-optical systems}
37/301 . . Arrangements enabling beams to pass between regions of different pressure
37/302 . . Controlling tubes by external information, e.g. program control (H01J 37/304 takes precedence)
37/3023 . . . {Program control}
37/3026 . . . . {Patterning strategy}
37/304 . . Controlling tubes by information coming from the objects {or from the beam}, e.g. correction signals
37/3045 . . . {Object or beam position registration}
37/305 . . for casting, melting, evaporating, or etching
37/3053 . . . {for evaporating or etching}
37/3056 . . . . {for microworking, e. g. etching of gratings or trimming of electrical components}
37/31 . . for cutting or drilling
37/315 . . for welding
37/317 . . for changing properties of the objects or for applying thin layers thereon, e.g. for ion implantation (H01J 37/36 takes precedence)
37/3171 . . . {for ion implantation}
37/3172 . . . . {Maskless patterned ion implantation}
37/3174 . . . {Particle-beam lithography, e.g. electron beam lithography}
37/3175 . . . . {Projection methods, i.e. transfer substantially complete pattern to substrate}
37/3177 . . . . {Multi-beam, e.g. fly's eye, comb probe}
37/3178 . . . {for applying thin layers on objects}
37/32 . Gas-filled discharge tubes (heating by discharge H05B)
37/32009 . . {Arrangements for generation of plasma specially adapted for examination or treatment of objects, e.g. plasma sources (plasma generation in general H05H 1/24)}
37/32018 . . . {Glow discharge}
37/32027 . . . . {DC powered}
37/32036 . . . . {AC powered}
37/32045 . . . . {Circuits specially adapted for controlling the glow discharge}
37/32055 . . . {Arc discharge}
37/32064 . . . . {Circuits specially adapted for controlling the arc discharge (for plasma torches H01H 1/36)}
37/32073 . . . {Corona discharge}
37/32082 . . . {Radio frequency generated discharge (H01J 37/32357, H01J 37/32366, H01J 37/32394 and H01J 37/32403 take precedence)}
37/32091 . . . . {the radio frequency energy being capacitively coupled to the plasma}

37/321 . . . . {the radio frequency energy being inductively coupled to the plasma}
37/3211 . . . . . {Antennas, e.g. particular shapes of coils}
37/32119 . . . . . {Windows}
37/32128 . . . . {using particular waveforms, e.g. polarised waves}
37/32137 . . . . {controlling of the discharge by modulation of energy}
37/32146 . . . . . {Amplitude modulation, includes pulsing}
37/32155 . . . . . {Frequency modulation}
37/32165 . . . . . {Plural frequencies}
37/32174 . . . . {Circuits specially adapted for controlling the RF discharge}
37/32183 . . . . . {Matching circuits}
37/32192 . . . {Microwave generated discharge (H01J 37/32357, H01J 37/32366, H01J 37/32394, H01J 37/32403 take precedence)}
37/32201 . . . . {Generating means}
37/32211 . . . . {Means for coupling power to the plasma}
37/3222 . . . . . {Antennas}
37/32229 . . . . . {Waveguides}
37/32238 . . . . . {Windows}
37/32247 . . . . . {Resonators}
37/32256 . . . . . {Tuning means}
37/32266 . . . . {Means for controlling power transmitted to the plasma}
37/32275 . . . . . {Microwave reflectors}
37/32284 . . . . . {Means for controlling or selecting resonance mode}
37/32293 . . . . {using particular waveforms, e.g. polarised waves}
37/32302 . . . . {Plural frequencies}
37/32311 . . . . {Circuits specially adapted for controlling the microwave discharge}
37/32321 . . . {Discharge generated by other radiation (H01J 37/32055, H01J 37/32073, H01J 37/32082, H01J 37/32192, H01J 37/32348 take precedence)}
37/3233 . . . . {using charged particles}
37/32339 . . . . {using electromagnetic radiation}
37/32348 . . . {Dielectric barrier discharge}
37/32357 . . . {Generation remote from the workpiece, e.g. down-stream}
37/32366 . . . {Localised processing}
37/32376 . . . . {Scanning across large workpieces}
37/32385 . . . . {Treating the edge of the workpieces}
37/32394 . . . {Treating interior parts of workpieces}
37/32403 . . . {Treating multiple sides of workpieces, e.g. 3D workpieces}
37/32412 . . . {Plasma immersion ion implantation}
37/32422 . . . {Arrangement for selecting ions or species in the plasma}
37/32431 . . {Constructional details of the reactor}
37/3244 . . . {Gas supply means}
37/32449 . . . . {Gas control, e.g. control of the gas flow}
37/32458 . . . {Vessel}
37/32467 . . . . {Material}
37/32477 . . . . {characterised by the means for protecting vessels or internal parts, e.g. coatings}
37/32486 . . . . . {Means for reducing recombination coefficient}
37/32495 . . . . . {Means for protecting the vessel against plasma}
37/32504 . . . . . {Means for preventing sputtering of the vessel}
37/32513 . . . . {Sealing means, e.g. sealing between different parts of the vessel}
37/32522 . . . . {Temperature}
37/32532 . . . {Electrodes}
37/32541 . . . . {Shape}
37/3255 . . . . {Material}
37/32559 . . . . {Protection means, e.g. coatings}
37/32568 . . . . {Relative arrangement or disposition of electrodes; moving means}
37/32577 . . . . {Electrical connecting means}
37/32587 . . . . {Triode systems}
37/32596 . . . . {Hollow cathodes}
37/32605 . . . . {Removable or replaceable electrodes or electrode systems}
37/32614 . . . . {Consumable cathodes for arc discharge}
37/32623 . . . {Mechanical discharge control means}
37/32633 . . . . {Baffles}
37/32642 . . . . {Focus rings}
37/32651 . . . . {Shields, e.g. dark space shields, Faraday shields}
37/3266 . . . {Magnetic control means}
37/32669 . . . . {Particular magnets or magnet arrangements for controlling the discharge}
37/32678 . . . . {Electron cyclotron resonance}
37/32688 . . . . {Multi-cusp fields}
37/32697 . . . {Electrostatic control}
37/32706 . . . . {Polarising the substrate}
37/32715 . . . {Workpiece holder}
37/32724 . . . . {Temperature}
37/32733 . . . {Means for moving the material to be treated}
37/32743 . . . . {for introducing the material into processing chamber}
37/32752 . . . . {for moving the material across the discharge}
37/32761 . . . . . {Continuous moving}
37/3277 . . . . . {of continuous material}
37/32779 . . . . . {of batches of workpieces}
37/32788 . . . . {for extracting the material from the process chamber}
37/32798 . . . {Further details of plasma apparatus not provided for in groups H01J 37/3244 - H01J 37/32788; special provisions for cleaning or maintenance of the apparatus}
37/32807 . . . . {Construction (includes replacing parts of the apparatus)}
37/32816 . . . . {Pressure}
37/32825 . . . . . {Working under atmospheric pressure or higher}
37/32834 . . . . . {Exhausting}
37/32844 . . . . . {Treating effluent gases}
37/32853 . . . . {Hygiene}
37/32862 . . . . . {In situ cleaning of vessels and/or internal parts}
37/32871 . . . . . {Means for trapping or directing unwanted particles}
37/3288 . . . . {Maintenance}
37/32889 . . . . {Connection or combination with other apparatus}

37/32899 . . . . {Multiple chambers, e.g. cluster tools}
37/32908 . . . . {Utilities}
37/32917 . . {Plasma diagnostics}
37/32926 . . . {Software, data control or modelling}
37/32935 . . . {Monitoring and controlling tubes by information coming from the object and/or discharge}
37/32944 . . . . {Arc detection}
37/32954 . . . . {Electron temperature measurement}
37/32963 . . . . {End-point detection}
37/32972 . . . . {Spectral analysis}
37/32981 . . . . {Gas analysis}
37/3299 . . . {Feedback systems}
37/34 . . operating with cathodic sputtering (H01J 37/36 takes precedence {; methods of cathodic sputtering C23C 14/34})
37/3402 . . . {using supplementary magnetic fields}
37/3405 . . . . {Magnetron sputtering}
37/3408 . . . . . {Planar magnetron sputtering}
37/3411 . . . {Constructional aspects of the reactor}
37/3414 . . . . {Targets}
37/3417 . . . . . {Arrangements}
37/342 . . . . . {Hollow targets}
37/3423 . . . . . {Shape}
37/3426 . . . . . {Material}
37/3429 . . . . . {Plural materials}
37/3432 . . . . . {Target-material dispenser}
37/3435 . . . . {Target holders (includes backing plates and endblocks)}
37/3438 . . . . {Electrodes other than cathode}
37/3441 . . . . {Dark space shields}
37/3444 . . . . {Associated circuits}
37/3447 . . . . {Collimators, shutters, apertures}
37/345 . . . . {Magnet arrangements in particular for cathodic sputtering apparatus (material of magnets or magnets in general H01F 1/00, H01F 7/00)}
37/3452 . . . . . {Magnet distribution}
37/3455 . . . . . {Movable magnets}
37/3458 . . . . . {Electromagnets in particular for cathodic sputtering apparatus (electromagnets in general H01F 7/06)}
37/3461 . . . . {Means for shaping the magnetic field, e.g. magnetic shunts}
37/3464 . . . {Operating strategies}
37/3467 . . . . {Pulsed operation, e.g. HIPIMS}
37/347 . . . . {Thickness uniformity of coated layers or desired profile of target erosion}
37/3473 . . . . {Composition uniformity or desired gradient}
37/3476 . . . {Testing and control}
37/3479 . . . . {Detecting exhaustion of target material}
37/3482 . . . . {Detecting or avoiding eroding through}
37/3485 . . . . {Means for avoiding target poisoning}
37/3488 . . . {Constructional details of particle beam apparatus not otherwise provided for, e.g. arrangement, mounting, housing, environment; special provisions for cleaning or maintenance of the apparatus}
37/3491 . . . . {Manufacturing of targets}
37/3494 . . . . {Adaptation to extreme pressure conditions}
37/3497 . . . . {Temperature of target}

37/36 . . for cleaning surfaces while plating with ions of materials introduced into the discharge, e.g. introduced by evaporation {(condensing of electrically charged vapour onto a surface for covering materials with metals C23C 14/32)}

40/00 Photoelectric discharge tubes not involving the ionisation of a gas (H01J 49/00 takes precedence)
40/02 . Details
40/04 . . Electrodes
40/06 . . . Photo-emissive cathodes
40/08 . . Magnetic means for controlling discharge
40/10 . . Selection of substances for gas fillings
40/12 . . One or more circuit elements structurally associated with the tube
40/14 . . Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for
40/16 . having photo- emissive cathode, e.g. alkaline photoelectric cell (operating with secondary emission H01J 43/00)
40/18 . . with luminescent coatings for influencing the sensitivity of the tube, e.g. by converting the input wavelength
40/20 . . wherein a light-ray scans a photo-emissive screen

41/00 Discharge tubes for measuring pressure of introduced gas {or for detecting presence of gas}; Discharge tubes for evacuation by diffusion of ions
41/02 . Discharge tubes for measuring pressure of introduced gas {or for detecting presence of gas}
41/04 . . with ionisation by means of thermionic cathodes
41/06 . . with ionisation by means of cold cathodes
41/08 . . with ionisation by means of radioactive substances, e.g. alphatrons
41/10 . . of particle spectrometer type (particle spectrometers per se H01J 49/00)
41/12 . Discharge tubes for evacuating by diffusion of ions, e.g. ion pumps, getter ion pumps
41/14 . . with ionisation by means of thermionic cathodes
41/16 . . . using gettering substances
41/18 . . with ionisation by means of cold cathodes
41/20 . . . using gettering substances

43/00 Secondary-emission tubes; Electron-multiplier tubes (dynamic electron-multiplier tubes H01J 25/76)
43/02 . Tubes in which one or a few electrodes are secondary-electron emitting electrodes
43/025 . . {Circuits therefor}
43/04 . Electron multipliers {(if forming part of electron gun H01J 3/023)}
43/045 . . {Position sensitive electron multipliers}
43/06 . . Electrode arrangements
43/08 . . . Cathode arrangements (construction of photo cathodes H01J 40/06, H01J 40/16, H01J 47/00, H01J 49/08)
43/10 . . . Dynodes (H01J 43/24, H01J 43/26 take precedence)
43/12 . . . Anode arrangements
43/14 . . . Control of electron beam by magnetic field
43/16 . . . Electrode arrangements using essentially one dynode
43/18 . . . Electrode arrangements using essentially more than one dynode

43/20 . . . . Dynodes consisting of sheet material, e.g. plane, bent

43/22 . . . . Dynodes consisting of electron-permeable material, e.g. foil, grid, tube, venetian blind

43/24 . . . . Dynodes having potential gradient along their surfaces

43/243 . . . . . {Dynodes consisting of a piling-up of channel-type dynode plates}

43/246 . . . . . {Microchannel plates [MCP] (image amplification tubes using MCP H01J 31/507)}

43/26 . . . . Box dynodes

43/28 . . Vessels {, e.g. wall of the tube}; Windows; Screens; Suppressing undesired discharges or currents

43/30 . . Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for

45/00 Discharge tubes functioning as thermionic generators {(structural combination of fuel element with thermoelectric element G21C 3/40; nuclear power plants using thermionic converters G21D 7/04; structural combination of a radioactive source with a thermionic converter, e.g. radioisotope batteries G21H 1/10; generators in which thermal or kinetic energy is converted into electrical energy by ionisation of a fluid and removal of the charge therefrom H02N 3/00)**}**

47/00 Tubes for determining the presence, intensity, density or energy of radiation or particles ({discharge tubes using igniting by associated radioactive materials or fillings, e.g. current stabilising tubes H01J 17/32} ; photoelectric discharge tubes not involving the ionisation of a gas H01J 40/00 {; discharge tubes for measuring the pressure, partial pressure of introduced gas or for detecting presence of gas H01J 41/02; ionisation chambers using a solid dielectric G01T 3/008})

47/001 . {Details}

47/002 . . {Vessels or containers}

47/003 . . . {using tissue-equivalent materials}

47/004 . . . {Windows permeable to X-rays, gamma-rays, or particles (windows for discharge tubes with provision for emergence of electrons or ions from the vessel H01J 33/04; windows for X-ray tubes H01J 35/18)}

47/005 . . {Gas fillings (H01J 47/12 takes precedence); Maintaining the desired pressure within the tube}

47/006 . . . {Tissue equivalent gas fillings}

47/007 . {Flash detectors}

47/008 . {Drift detectors}

47/02 . Ionisation chambers

47/022 . . {Calibration thereof}

47/024 . . {Well-type ionisation chambers}

47/026 . . {Gas flow ionisation chambers}

47/028 . . {using a liquid dielectric}

47/04 . . Capacitive ionisation chambers, e.g. the electrodes of which are used as electrometers

47/06 . Proportional counter tubes

47/062 . . {Multiwire proportional counter tubes}

47/065 . . {Well-type proportional counter tubes}

47/067 . . {Gas flow proportional counter tubes}

47/08 . Geiger-Müller counter tubes {(gas filling with very short deionisation times H01J 17/64, H01T)}

47/10 . Spark counters (H01J 47/14 takes precedence; spark gaps H01T)

47/12 . Neutron detector tubes, e.g. BF_3 tubes

47/1205 . . {using nuclear reactions of the type (n, alpha) in solid materials, e.g. Boron-10 (n,alpha) Lithium-7, Lithium-6 (n, alpha)Hydrogen-3}

47/1211 . . . {Ionisation chambers}

47/1216 . . . . {Gamma compensated}

47/1222 . . . {Proportional counters}

47/1227 . . {Fission detectors}

47/1233 . . . {Ionisation chambers}

47/1238 . . . {Counters}

47/1244 . . . . {Multiwire counters}

47/125 . . {Helium ionisation detectors}

47/1255 . . . {Ionisation chambers}

47/1261 . . . {Counters}

47/1266 . . . . {Multi-wire counters}

47/1272 . . {BF_3 tubes}

47/1277 . . {Light-nuclei-recoil ionisation detectors, e.g. using protons, alpha-particles}

47/1283 . . . {Ionisation chambers}

47/1288 . . . {Counters}

47/1294 . . . . {Multi-wire counters}

47/14 . Parallel electrode spark or streamer chambers; Wire spark or streamer chambers {(circuit arrangements with multi-wire or parallel-plate chambers for recording of movements or tracks of particles G01T 5/12)}

47/16 . . characterised by readout of each individual wire

47/18 . . . the readout being electrical (H01J 47/20 takes precedence)

47/20 . . . the readout employing electrical or mechanical delay lines, e.g. magnetostrictive delay lines

47/22 . . characterised by another type of readout

47/24 . . . the readout being acoustical

47/26 . . . the readout being optical

49/00 Particle spectrometers or separator tubes

NOTE

In classifying particle separators, no distinction is made between spectrometry and spectrography, the difference being only in the manner of detection which in the first case is electrical and in the second case is by means of a photographic film.

49/0004 . {Imaging particle spectrometry}

49/0009 . {Calibration of the apparatus}

49/0013 . {Miniaturised spectrometers, e.g. having smaller than usual scale, integrated conventional components}

49/0018 . . {Microminiaturised spectrometers, e.g. chip-integrated devices, Micro-Electro-Mechanical Systems [MEMS]}

49/0022 . {Portable spectrometers, e.g. devices comprising independent power supply, constructional details relating to portability (small scale devices per se H01J 49/0013 and H01J 49/0018)}

49/0027 . {Methods for using particle spectrometers}

49/0031 . . {Step by step routines describing the use of the apparatus (H01J 49/0081 takes precedence)}

49/0036 . . {Step by step routines describing the handling of the data generated during a measurement}
49/004 . {Combinations of spectrometers, tandem spectrometers, e.g. MS/MS, MSn}
49/0045 . . {characterised by the fragmentation or other specific reaction}
49/005 . . . {by collision with gas, e.g. by introducing gas or by accelerating ions with an electric field}
49/0054 . . . {by an electron beam, e.g. electron impact dissociation, electron capture dissociation}
49/0059 . . . {by a photon beam, photo-dissociation}
49/0063 . . . {by applying a resonant excitation voltage}
49/0068 . . . {by collision with a surface, e.g. surface induced dissociation}
49/0072 . . . {by ion/ion reaction, e.g. electron transfer dissociation, proton transfer dissociation}
49/0077 . . . {specific reactions other than fragmentation}
49/0081 . . {Tandem in time, i.e. using a single spectrometer}
49/0086 . . {Accelerator mass spectrometers}
49/009 . . {Spectrometers having multiple channels, parallel analysis}
49/0095 . {Particular arrangements for generating, introducing or analyzing both positive and negative analyte ions (ion/ion reactions H01J 49/0072)}
49/02 . Details
49/022 . . {Circuit arrangements, e.g. for generating deviation currents or voltages (regulating electric or magnetic variables in general, e.g. current, magnetic field G05F); Components associated with high voltage supply (high voltage supply per se H02M)}
49/025 . . {Detectors specially adapted to particle spectrometers (data acquisition H01J 49/0036; detectors per se G01T, e.g. G01T 1/28, G01T 1/29)}
49/027 . . . {detecting image current induced by the movement of charged particles (H01J 49/38 takes precedence)}
49/04 . . Arrangements for introducing or extracting samples to be analysed, e.g. vacuum locks; Arrangements for external adjustment of electron- or ion-optical components
49/0404 . . . {Capillaries used for transferring samples or ions (electrospray nozzles H01J 49/167)}
49/0409 . . . {Sample holders or containers (containers for retaining a material to be analyzed, B01L 3/50, for DNA, C12Q 1/6834, for biological materials, G01N 33/543)}
49/0413 . . . . {for automated handling}
49/0418 . . . . {for laser desorption, e.g. matrix-assisted laser desorption/ionisation [MALDI] plates or surface enhanced laser desorption/ ionisation [SELDI] plates}
49/0422 . . . {for gaseous samples (interfaces to gas chromatographs G01N 30/7206)}
49/0427 . . . . {using a membrane permeable to gases}
49/0431 . . . {for liquid samples (interfaces to liquid chromatographs G01N 30/7233)}
49/0436 . . . . {using a membrane permeable to liquids}
49/044 . . . . {with means for preventing droplets from entering the analyzer; Desolvation of droplets}
49/0445 . . . . {with means for introducing as a spray, a jet or an aerosol (electrospray ion sources H01J 49/165)}
49/045 . . . . . {with means for using a nebulising gas, i.e. pneumatically assisted}
49/0454 . . . . {with means for vaporising using mechanical energy, e.g. by ultrasonic vibrations}
49/0459 . . . {for solid samples}
49/0463 . . . . {Desorption by laser or particle beam, followed by ionisation as a separate step (sample holder per se H01J 49/0418)}
49/0468 . . . {with means for heating or cooling the sample}
49/0472 . . . . {with means for pyrolysis}
49/0477 . . . . {using a hot fluid}
49/0481 . . . . {with means for collisional cooling}
49/0486 . . . . {with means for monitoring the sample temperature}
49/049 . . . . {with means for applying heat to desorb the sample; Evaporation}
49/0495 . . . {Vacuum locks; Valves (valves per se F16K)}
49/06 . . Electron- or ion-optical arrangements
49/061 . . . {Ion deflecting means, e.g. ion gates}
49/062 . . . {Ion guides (linear ion traps performing mass selection H01J 49/4225, mass filters H01J 49/421)}
49/063 . . . . {Multipole ion guides, e.g. quadrupoles, hexapoles}
49/065 . . . . {having stacked electrodes, e.g. ring stack, plate stack}
49/066 . . . . . {Ion funnels}
49/067 . . . {Ion lenses, apertures, skimmers}
49/068 . . . {Mounting, supporting, spacing, or insulating electrodes}
49/08 . . Electron sources, e.g. for generating photo-electrons, secondary electrons or Auger electrons
49/10 . . Ion sources; Ion guns
49/102 . . . {using reflex discharge, e.g. Penning ion sources}
49/105 . . . {using high-frequency excitation, e.g. microwave excitation, Inductively Coupled Plasma [ICP]}
49/107 . . . {Arrangements for using several ion sources}
49/12 . . . using an arc discharge, e.g. of the duoplasmatron type
49/123 . . . . {Duoplasmatrons}
49/126 . . . . {Other arc discharge ion sources using an applied magnetic field}
49/14 . . . using particle bombardment, e.g. ionisation chambers
49/142 . . . . {using a solid target which is not previously vapourised}
49/145 . . . . {using chemical ionisation}
49/147 . . . . {with electrons, e.g. electron impact ionisation, electron attachment (H01J 49/145 takes precedence)}
49/16 . . . using surface ionisation, e.g. field-, thermionic- or photo-emission
49/161 . . . . {using photoionisation, e.g. by laser}
49/162 . . . . . {Direct photo-ionisation, e.g. single photon or multi-photon ionisation}
49/164 . . . . . {Laser desorption/ionisation, e.g. matrix-assisted laser desorption/ionisation [MALDI] (sample holders H01J 49/0418)}
49/165 . . . . {Electrospray ionisation}

49/167 . . . . . {Capillaries and nozzles specially adapted therefor; (electrostatic spraying per se B05B 5/00)}
49/168 . . . . {field ionisation, e.g. corona discharge (atmospheric pressure corona discharge per se H01T 19/00)}
49/18 . . . using spark ionisation
49/20 . . Magnetic deflection
49/22 . . Electrostatic deflection
49/24 . . Vacuum systems, e.g. maintaining desired pressures
49/26 . Mass spectrometers or separator tubes
49/28 . . Static spectrometers
49/282 . . . {using electrostatic analysers}
49/284 . . . {using electrostatic and magnetic sectors with simple focusing, e.g. with parallel fields such as Aston spectrometer}
49/286 . . . . {with energy analysis, e.g. Castaing filter (in cathode-ray or electron-beam tubes H01J 29/84; electron- or ion-optical arrangements for separating electrons or ions from an analysing or processing beam H01J 37/05; micro- or spot-analysing tubes H01J 37/252)}
49/288 . . . . . {using crossed electric and magnetic fields perpendicular to the beam, e.g. Wien filter}
49/30 . . . using magnetic analysers {, e.g. Dempster spectrometer}
49/305 . . . . {with several sectors in tandem}
49/32 . . . using double focusing
49/322 . . . . {with a magnetic sector of 90 degrees, e.g. Mattauch-Herzog type}
49/324 . . . . {with an electrostatic section of 90 degrees, e.g. Nier-Johnson type}
49/326 . . . . {with magnetic and electrostatic sectors of 90 degrees}
49/328 . . . . {with a cycloidal trajectory by using crossed electric and magnetic fields, e.g. trochoidal type}
49/34 . . Dynamic spectrometers
49/36 . . . Radio frequency spectrometers, e.g. Bennett-type spectrometers, Redhead-type spectrometers
49/38 . . . . Omegatrons {; using ion cyclotron resonance}
49/40 . . . Time-of-flight spectrometers (H01J 49/36 takes precedence)
49/401 . . . . {characterised by orthogonal acceleration, e.g. focusing or selecting the ions, pusher electrode}
49/403 . . . . {characterised by the acceleration optics and/or the extraction fields}
49/405 . . . . {characterised by the reflectron, e.g. curved field, electrode shapes}
49/406 . . . . {with multiple reflections}
49/408 . . . . {with multiple changes of direction, e.g. by using electric or magnetic sectors, closed-loop time-of-flight}
49/42 . . . Stability-of-path spectrometers, e.g. monopole, quadrupole, multipole, farvitrons
49/4205 . . . . {Device types}
49/421 . . . . . {Mass filters, i.e. deviating unwanted ions without trapping}
49/4215 . . . . . {Quadrupole mass filters (H01J 49/4225 takes precedence)}
49/422 . . . . . {Two-dimensional RF ion traps (ion guides without mass selection H01J 49/062)}
49/4225 . . . . . {Multipole linear ion traps, e.g. quadrupoles, hexapoles}
49/423 . . . . . {with radial ejection}
49/4235 . . . . . {Stacked rings or stacked plates}
49/424 . . . . . {Three-dimensional ion traps, i.e. comprising end-cap and ring electrodes}
49/4245 . . . . . {Electrostatic ion traps (H01J 49/422 takes precedence)}
49/425 . . . . . {with a logarithmic radial electric potential, e.g. orbitraps}
49/4255 . . . . . {with particular constructional features}
49/426 . . . . {Methods for controlling ions}
49/4265 . . . . . {Controlling the number of trapped ions; preventing space charge effects}
49/427 . . . . . {Ejection and selection methods}
49/4275 . . . . . {Applying a non-resonant auxiliary oscillating voltage, e.g. parametric excitation}
49/428 . . . . . {Applying a notched broadband signal}
49/4285 . . . . . {Applying a resonant signal, e.g. selective resonant ejection matching the secular frequency of ions (H01J 49/429, H01J 49/428 take precedence)}
49/429 . . . . . {Scanning an electric parameter, e.g. voltage amplitude or frequency}
49/4295 . . . . . {Storage methods}
49/44 . Energy spectrometers, e.g. alpha-, beta-spectrometers
49/443 . . {Dynamic spectrometers}
49/446 . . . {Time-of-flight spectrometers}
49/46 . . Static spectrometers
49/463 . . . {using static magnetic fields}
49/466 . . . {using crossed electric and magnetic fields perpendicular to the beam, e.g. Wien filter (see also H01J 49/288)}
49/48 . . . using electrostatic analysers, e.g. cylindrical sector, Wien filter
49/482 . . . . {with cylindrical mirrors}
49/484 . . . . {with spherical mirrors}
49/486 . . . . {with plane mirrors, i.e. uniform field}
49/488 . . . . {with retarding grids}

Discharge lamps

61/00 Gas-discharge or vapour-discharge lamps (arc lamps with consumable electrodes H05B; electroluminescent lamps H05B)
61/02 . Details
61/025 . . {Associated optical elements}
61/04 . . Electrodes (for igniting H01J 61/54); Screens; Shields
61/045 . . . {Thermic screens or reflectors (heat-reflecting coatings on the wall of the vessel H01J 61/35)}
61/06 . . . Main electrodes
61/067 . . . . for low-pressure discharge lamps
61/0672 . . . . . {characterised by the construction of the electrode}
61/0675 . . . . . {characterised by the material of the electrode}

61/0677 . . . . . {characterised by the electron emissive material}
61/073 . . . . for high-pressure discharge lamps
61/0732 . . . . . {characterised by the construction of the electrode}
61/0735 . . . . . {characterised by the material of the electrode}
61/0737 . . . . . {characterised by the electron emissive material}
61/09 . . . . Hollow cathodes
61/10 . . . Shields, screens, or guides for influencing the discharge
61/103 . . . . {Shields, screens or guides arranged to extend the discharge path (H01J 61/106 takes precedence)}
61/106 . . . . {using magnetic means}
61/12 . . Selection of substances for gas fillings; Specified operating pressure or temperature
61/125 . . . {having an halogenide as principal component}
61/14 . . . having one or more carbon compounds as the principal constituents
61/16 . . . having helium, argon, neon, krypton, or xenon as the principle constituent
61/18 . . . having a metallic vapour as the principal constituent
61/20 . . . . mercury vapour
61/22 . . . . vapour of an alkali metal
61/24 . . Means for obtaining or maintaining the desired pressure within the vessel
61/26 . . . Means for absorbing or adsorbing gas, e.g. by gettering; Means for preventing blackening of the envelope
61/28 . . . Means for producing, introducing, or replenishing gas or vapour during operation of the lamp
61/30 . . Vessels; Containers
61/302 . . . {characterised by the material of the vessel}
61/305 . . . {Flat vessels or containers}
61/307 . . . . {with folded elongated discharge path}
61/32 . . . Special longitudinal shape, e.g. for advertising purposes {(H01J 61/305 takes precedence)}
61/322 . . . . {Circular lamps}
61/325 . . . . {U-shaped lamps}
61/327 . . . . {"Compact"-lamps, i.e. lamps having a folded discharge path}
61/33 . . . Special shape of cross-section, e.g. for producing cool spot
61/34 . . . Double-wall vessels or containers
61/35 . . . provided with coatings on the walls thereof; Selection of materials for the coatings (using coloured coatings H01J 61/40; using luminescent coatings H01J 61/42)
61/36 . . Seals between parts of vessels; Seals for leading-in conductors; Leading-in conductors
61/361 . . . {Seals between parts of vessel}
61/363 . . . . {End-disc seals or plug seals}
61/365 . . . . {Annular seals disposed between the ends of the vessel (H01J 61/363 takes precedence)}
61/366 . . . {Seals for leading-in conductors}
61/368 . . . . {Pinched seals or analogous seals}
61/38 . . Devices for influencing the colour or wavelength of the light
61/40 . . . by light filters; by coloured coatings in or on the envelope
61/42 . . . by transforming the wavelength of the light by luminescence
61/44 . . . . Devices characterised by the luminescent material
61/46 . . . . Devices characterised by the binder or other non-luminescent constituent of the luminescent material, e.g. for obtaining desired pouring or drying properties
61/48 . . . . Separate coatings of different luminous materials
61/50 . . Auxiliary parts or solid material within the envelope for reducing risk of explosion upon breakage of the envelope, e.g. for use in mines
61/52 . . Cooling arrangements; Heating arrangements; Means for circulating gas or vapour within the discharge space {(heating or cooling arrangements to promote ionisation for starting H01J 61/54)}
61/523 . . . {Heating or cooling particular parts of the lamp}
61/526 . . . . {heating or cooling of electrodes}
61/54 . . Igniting arrangements, e.g. promoting ionisation for starting
61/541 . . . {using a bimetal switch}
61/542 . . . . {and an auxiliary electrode inside the vessel}
61/544 . . . . {and an auxiliary electrode outside the vessel}
61/545 . . . {using an auxiliary electrode inside the vessel (H01J 61/542 takes precedence)}
61/547 . . . {using an auxiliary electrode outside the vessel (H01J 61/544 takes precedence)}
61/548 . . . {using radioactive means to promote ionisation}
61/56 . . One or more circuit elements structurally associated with the lamp
61/58 . Lamps with both liquid anode and liquid cathode
61/60 . Lamps in which the discharge space is substantially filled with mercury before ignition
61/62 . Lamps with gaseous cathode, e.g. plasma cathode
61/64 . Cathode glow lamps
61/66 . . having one or more specially shaped cathodes, e.g. for advertising purposes {alphanumeric}
61/68 . Lamps in which the main discharge is between parts of a current-carrying guide, e.g. halo lamp
61/70 . Lamps with low-pressure unconstricted discharge {having a cold pressure < 400 Torr}
61/72 . . having a main light-emitting filling of easily vaporisable metal vapour, e.g. mercury
61/74 . . having a main light-emitting filling of difficult vaporisable metal vapour, e.g. sodium
61/76 . . having a filling of permanent gas or gases only
61/78 . . . with cold cathode; with cathode heated only by discharge, e.g. high-tension lamp for advertising
61/80 . . Lamps suitable only for intermittent operation, e.g. flash lamp
61/82 . Lamps with high-pressure unconstricted discharge {having a cold pressure > 400 Torr}
61/822 . . {High-pressure mercury lamps}
61/825 . . {High-pressure sodium lamps}
61/827 . . {Metal halide arc lamps}
61/84 . Lamps with discharge constricted by high pressure

61/86 . . with discharge additionally constricted by close spacing of electrodes, e.g. for optical projection
61/88 . . with discharge additionally constricted by envelope
61/90 . . Lamps suitable only for intermittent operation, e.g. flash lamp
61/92 . Lamps with more than one main discharge path
61/94 . . Paths producing light of different wavelengths, e.g. for simulating daylight
61/95 . Lamps with control electrode for varying intensity or wavelength of the light, e.g. for producing modulated light
61/96 . Lamps with light-emitting discharge path and separately-heated incandescent body within a common envelope, e.g. for simulating daylight
61/98 . Lamps with closely spaced electrodes heated to incandescence by light-emitting discharge, e.g. tungsten arc lamp

63/00 Cathode-ray or electron-stream lamps
63/02 . Details, e.g. electrode, gas filling, shape of vessel
63/04 . . Vessels provided with luminescent coatings; Selection of materials for the coatings
63/06 . Lamps with luminescent screen excited by the ray or stream
63/08 . Lamps with gas plasma excited by the ray or stream

65/00 Lamps without any electrode inside the vessel; Lamps with at least one main electrode outside the vessel
65/04 . Lamps in which a gas filling is excited to luminesce by an external electromagnetic field or by external corpuscular radiation, e.g. for indicating {plasma display panels}
65/042 . . {by an external electromagnetic field}
65/044 . . . {the field being produced by a separate microwave unit}
65/046 . . . {the field being produced by using capacitive means around the vessel}
65/048 . . . {the field being produced by using an excitation coil}
65/06 . Lamps in which a gas filling is excited to luminesce by radioactive material structurally associated with the lamp, e.g. inside the vessel
65/08 . Lamps in which a screen or coating is excited to luminesce by radioactive material located inside the vessel {(direct conversion of radiation energy from radioactive sources into light G21H 3/02)}

99/00 Subject matter not provided for in other groups of this subclass

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2201/00 Electrodes common to discharge tubes
2201/02 . Arrangements for eliminating deleterious effects
2201/025 . . charging
2201/19 . Thermionic cathodes
2201/193 . . Thin film cathodes
2201/196 . . Emission assisted by other physical processes, e.g. field- or photo emission
2201/28 . Heaters for thermionic cathodes
2201/2803 . . Characterised by the shape or size
2201/2807 . . . Block
2201/281 . . . Cage-like construction
2201/2814 . . . . being a mesh-like network
2201/2817 . . . Rods
2201/2821 . . . Envelope or cross-section
2201/2825 . . . . being oval or elliptic
2201/2828 . . . . being rectangular or square
2201/2832 . . . . being circular
2201/2835 . . . Folded
2201/2839 . . . . Hair-pin or simple bend
2201/2842 . . . Conic
2201/2846 . . . Loop
2201/285 . . . Plurality of elements
2201/2853 . . . Serpentine
2201/2857 . . . . being coiled
2201/286 . . . . being looped
2201/2864 . . . Ribbon or bar
2201/2867 . . . Spiral or helix
2201/2871 . . . . being flattened
2201/2875 . . . . being double, reverse helix or interwoven
2201/2878 . . . Thin film or film-like
2201/2882 . . . Variable winding density
2201/2885 . . . Twisted
2201/2889 . . Characterised by material
2201/2892 . . Coatings
2201/2896 . . . Insulating layers
2201/30 . Cold cathodes
2201/304 . . Field emission cathodes
2201/30403 . . . characterised by the emitter shape
2201/30407 . . . . Microengineered point emitters
2201/30411 . . . . . conical shaped, e.g. Spindt type
2201/30415 . . . . . needle shaped
2201/30419 . . . . Pillar shaped emitters
2201/30423 . . . . Microengineered edge emitters
2201/30426 . . . . Coatings on the emitter surface, e.g. with low work function materials
2201/3043 . . . . Fibres
2201/30434 . . . . Nanotubes
2201/30438 . . . . Particles
2201/30442 . . . . Whiskers
2201/30446 . . . characterised by the emitter material
2201/30449 . . . . Metals and metal alloys
2201/30453 . . . . Carbon types
2201/30457 . . . . . Diamond
2201/30461 . . . . . Graphite
2201/30465 . . . . . Fullerenes
2201/30469 . . . . . Carbon nanotubes (CNTs)
2201/30473 . . . . . Amorphous carbon
2201/30476 . . . . . Diamond-like carbon [DLC]
2201/3048 . . . . Semiconductor materials
2201/30484 . . . . Carbides
2201/30488 . . . . Nitrides
2201/30492 . . . . Borides
2201/30496 . . . . Oxides
2201/306 . . Ferroelectric cathodes
2201/308 . . Semiconductor cathodes, e.g. having PN junction layers
2201/312 . . having an electric field perpendicular to the surface thereof
2201/3125 . . . Metal-insulator-Metal [MIM] emission type cathodes
2201/316 . . having an electric field parallel to the surface thereof, e.g. thin film cathodes
2201/3165 . . . Surface conduction emission type cathodes

2201/317 . . combined with other synergetic effects, e.g. secondary, photo- or thermal emission
2201/319 . . Circuit elements associated with the emitters by direct integration
2201/3195 . . . Resistive members, e.g. resistive layers
2201/32 . Secondary emission electrodes
2201/34 . Photoemissive electrodes
2201/342 . . Cathodes
2201/3421 . . . Composition of the emitting surface
2201/3423 . . . . Semiconductors, e.g. GaAs, NEA emitters
2201/3425 . . . . Metals, metal alloys
2201/3426 . . . . Alkaline metal compounds, e.g. Na-K-Sb
2201/3428 . . . . Organo-metallic compounds, e.g. Ferrocene

2203/00 Electron or ion optical arrangements common to discharge tubes or lamps

2203/02 . Electron guns
2203/0204 . . using cold cathodes, e.g. field emission cathodes
2203/0208 . . . Control electrodes
2203/0212 . . . . Gate electrodes
2203/0216 . . . . . characterised by the form or structure
2203/022 . . . . . Shapes or dimensions of gate openings
2203/0224 . . . . . Arrangement of gate openings
2203/0228 . . . . . Curved/extending upwardly
2203/0232 . . . . . characterised by the material
2203/0236 . . . . . Relative position to the emitters, cathodes or substrates
2203/024 . . . . Focusing electrodes
2203/0244 . . . . . characterised by the form or structure
2203/0248 . . . . . Shapes or dimensions of focusing electrode openings
2203/0252 . . . . . Arrangement of focusing electrode openings
2203/0256 . . . . . characterised by the material
2203/026 . . . . . Relative position to the gateelectrodes, emitters, cathodes or substrates
2203/0264 . . . . . In the same plane as the gate electrodes or cathodes
2203/0268 . . . Insulation layer
2203/0272 . . . . for gate electrodes
2203/0276 . . . . for focusing electrodes
2203/028 . . . . characterised by the shape
2203/0284 . . . . . Dimensions of openings
2203/0288 . . . . characterised by the material
2203/0292 . . . Potentials applied to the electrodes
2203/0296 . . Spin-polarised beams
2203/04 . Ion guns

2209/00 Apparatus and processes for manufacture of discharge tubes

2209/01 . Generalised techniques
2209/012 . . Coating
2209/015 . . . Machines therefor
2209/017 . . Cleaning
2209/02 . Manufacture of cathodes
2209/022 . . Cold cathodes
2209/0223 . . . Field emission cathodes
2209/0226 . . . . Sharpening or resharpening of emitting point or edge
2209/18 . Assembling together the component parts of the discharge tube
2209/185 . . Machines therefor, e.g. electron gun assembling devices
2209/236 . Manufacture of magnetic deflecting devices
2209/2363 . . Coils
2209/2366 . . . Machines therefor, e.g. winding, forming, welding, or the like
2209/26 . Sealing parts of the vessel to provide a vacuum enclosure
2209/261 . . Apparatus used for sealing vessels, e.g. furnaces, machines or the like
2209/262 . . . means for applying sealing materials, e.g. frit paste dispensers
2209/264 . . Materials for sealing vessels, e.g. frit glass compounds, resins or structures
2209/265 . . Surfaces for sealing vessels
2209/267 . . . shaped surfaces or flanges
2209/268 . . . treated surfaces and surface preparations, e.g. to improve adhesion
2209/38 . Control of maintenance of pressure in the vessel
2209/383 . . Vacuum pumps
2209/385 . . Gettering
2209/3855 . . . Getter materials
2209/387 . . Gas filling
2209/389 . . Degassing
2209/3893 . . . by a discharge
2209/3896 . . . by heating
2209/46 . Handling of tube components during manufacture
2209/463 . . Identifying or selecting component pieces
2209/466 . . . Marking, e.g. bar-codes

2211/00 Plasma display panels with alternate current induction of the discharge, e.g. AC-PDPs

2211/10 . AC-PDPs with at least one main electrode being out of contact with the plasma
2211/12 . . with main electrodes provided on both sides of the discharge space
2211/14 . . with main electrodes provided only on one side of the discharge space
2211/16 . . with main electrodes provided inside or on the side face of the spacers
2211/18 . . containing a plurality of independent closed structures for containing the gas, e.g. plasma tube array [PTA] display panels
2211/20 . Constructional details
2211/22 . . Electrodes
2211/225 . . . Material of electrodes
2211/24 . . . Sustain electrodes or scan electrodes
2211/245 . . . . Shape, e.g. cross section or pattern
2211/26 . . . Address electrodes
2211/265 . . . . Shape, e.g. cross section or pattern
2211/28 . . . Auxiliary electrodes, e.g. priming electrodes or trigger electrodes
2211/30 . . . Floating electrodes
2211/32 . . . Disposition of the electrodes
2211/323 . . . . Mutual disposition of electrodes
2211/326 . . . . Disposition of electrodes with respect to cell parameters (H01J 2211/323 takes precedence), e.g. electrodes within the ribs
2211/34 . . Vessels, containers or parts thereof, e.g. substrates
2211/36 . . . Spacers, barriers, ribs, partitions or the like
2211/361 . . . . characterized by the shape
2211/363 . . . . . Cross section of the spacers
2211/365 . . . . . Pattern of the spacers
2211/366 . . . . characterized by the material

2211/368 . . . . Dummy spacers, e.g. in a non display region
2211/38 . . . Dielectric or insulating layers
2211/40 . . . Layers for protecting or enhancing the electron emission, e.g. MgO layers
2211/42 . . . Fluorescent layers
2211/44 . . . Optical arrangements or shielding arrangements, e.g. filters or lenses
2211/442 . . . . Light reflecting means; Anti-reflection means
2211/444 . . . . Means for improving contrast or colour purity, e.g. black matrix or light shielding means
2211/446 . . . . Electromagnetic shielding means; Antistatic means
2211/448 . . . . Near infrared shielding means
2211/46 . . Connecting or feeding means, e.g. leading-in conductors
2211/48 . . Sealing, e.g. seals specially adapted for leading-in conductors
2211/50 . . Filling, e.g. selection of gas mixture
2211/52 . . Means for absorbing or adsorbing the gas mixture, e.g. by gettering
2211/54 . . Means for exhausting the gas
2211/62 . . Circuit arrangements
2211/66 . . Cooling arrangements

2217/00 Gas-filled discharge tubes
2217/04 . Electrodes
2217/06 . . Cathodes
2217/062 . . . thermionic
2217/065 . . . heated by the discharge
2217/067 . . . Cold cathodes
2217/10 . . Anodes
2217/12 . . Control electrodes
2217/38 . Cold-cathode tubes
2217/40 . . Gas discharge switches
2217/402 . . . Multiple switches
2217/4025 . . . . for addressing electro-optical devices, i.e. LCD's
2217/49 . . Display panels, e.g. not making use of alternating current (H01J 2211/10 takes precedence)
2217/491 . . . characterised by problems peculiar to plasma displays
2217/4915 . . . . Luminosity
2217/492 . . . Details
2217/49207 . . . . Electrodes
2217/49214 . . . . . Shape
2217/49221 . . . . . Mutual disposition
2217/49228 . . . . . Crossed electrodes
2217/49235 . . . . . Side-by-side electrodes
2217/49242 . . . . . Auxiliary electrodes
2217/4925 . . . . . Mounting, supporting, spacing
2217/49257 . . . . . Means for isolating electrodes from the discharge, e.g. dielectric layers
2217/49264 . . . . Vessels
2217/49271 . . . . . Spacers between front and back panels
2217/49278 . . . . . Coatings (H01J 2217/49292 takes precedence)
2217/49285 . . . . Associated optical means
2217/49292 . . . . . Filters
2217/494 . . . A.C. panels
2217/498 . . . Hybrid panels (AC and DC)

2223/00 Details of transit-time tubes of the types covered by group H01J 2225/00
2223/005 . Cooling methods or arrangements
2223/02 . Electrodes; Magnetic control means; Screens
2223/027 . . Collectors
2223/0275 . . . Multistage collectors
2223/033 . . . Collector cooling devices
2223/04 . . Cathodes
2223/05 . . . having a cylindrical emissive surface, e.g. cathodes for magnetrons
2223/06 . . Electron or ion guns
2223/065 . . . producing a solid cylindrical beam
2223/07 . . . producing a hollow cylindrical beam
2223/075 . . . Magnetron injection guns
2223/08 . . Focusing arrangements, e.g. for concentrating stream of electrons, for preventing spreading of stream
2223/083 . . . Electrostatic focusing arrangements
2223/087 . . . Magnetic focusing arrangements
2223/0873 . . . . with at least one axial- field reversal along the interaction space, e.g. P.P.M. focusing
2223/0876 . . . . with arrangements improving the linearity and homogeniety of the axial field, e.g. field straightener
2223/09 . . Electric system for directing or deflecting the discharge along a desired path, e.g. E-type
2223/10 . . Magnet systems for directing or deflecting the discharge along a desired path, e.g. a spiral path
2223/11 . . Means for reducing noise
2223/12 . Vessels; Containers
2223/14 . Leading-in arrangements; Seals therefor
2223/15 . . Means for preventing wave energy leakage structurally associated with tube leading-in arrangements, e.g. filters, chokes, attenuating devices
2223/16 . Circuit elements, having distributed capacitance and inductance, structurally associated with the tube and interacting with the discharge
2223/165 . . Manufacturing processes or apparatus therefore
2223/18 . . Resonators
2223/20 . . . Cavity resonators; Adjustment or tuning thereof
2223/207 . . . . Tuning of single resonator
2223/213 . . . . Simultaneous tuning of more than one resonator, e.g. resonant cavities of a magnetron
2223/22 . . . Connections between resonators, e.g. strapping for connecting resonators of a magnetron
2223/24 . . Slow-wave structures, e.g. delay systems
2223/26 . . . Helical slow-wave structures; Adjustment therefor
2223/27 . . . . Helix-derived slow-wave structures
2223/28 . . . Interdigital slow-wave structures; Adjustment therefor
2223/30 . . . Damping arrangements associated with slow-wave structures, e.g. for suppression of unwanted oscillations
2223/34 . Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for
2223/36 . Coupling devices having distributed capacitance and inductance, structurally associated with the tube, for introducing or removing wave energy
2223/38 . . to or from the discharge

2223/40 . . to or from the interaction circuit
2223/42 . . . the interaction circuit being a helix or a helix-derived slow- wave structure
2223/44 . . . Rod-type coupling devices
2223/46 . . . Loop coupling devices
2223/48 . . . for linking interaction circuit with coaxial lines; Devices of the coupled helices type
2223/50 . . . . the interaction circuit being a helix or derived from a helix
2223/52 . . . . the coupled helices being disposed coaxially around one another
2223/54 . . Filtering devices preventing unwanted frequencies or modes to be coupled to, or out of, the interaction circuit; Prevention of high frequency leakage in the environment

2225/00 Transit-time tubes, e.g. Klystrons, travelling-wave tubes, magnetrons

2225/005 . Gas-filled transit-time tubes
2225/02 . Tubes with electron stream modulated in velocity or density in a modulator zone and thereafter giving up energy in an inducing zone, the zones being associated with one or more resonators
2225/025 . . with an electron stream following a helical path
2225/04 . . Tubes having one or more resonators, without reflection of the electron stream, and in which the modulation produced in the modulator zone is mainly density modulation, e.g. Heaff tube
2225/06 . . Tubes having only one resonator, without reflection of the electron stream, and in which the modulation produced in the modulator zone is mainly velocity modulation, e.g. Lüdi-Klystron
2225/08 . . . with electron stream perpendicular to the axis of the resonator
2225/10 . . Klystrons, i.e. tubes having two or more resonators, without reflection of the electron stream, and in which the stream is modulated mainly by velocity in the zone of the input resonator
2225/11 . . . Extended interaction Klystrons
2225/12 . . . with pencil-like electron stream in the axis of the resonators
2225/14 . . . with tube-like electron stream coaxial with the axis of the resonators
2225/16 . . . with pencil-like electron stream perpendicular to the axis of the resonators
2225/18 . . . with radial or disc-like electron stream perpendicular to the axis of the resonators
2225/20 . . . having special arrangements in the space between resonators, e.g. resistive-wall amplifier tube, space-charge amplifier tube, velocity-jump tube
2225/22 . . Reflex Klystrons, i.e. tubes having one or more resonators, with a single reflection of the electron stream, and in which the stream is modulated mainly by velocity in the modulator zone
2225/24 . . . in which the electron stream is in the axis of the resonator or resonators and is pencil-like before reflection
2225/26 . . . in which the electron stream is coaxial with the axis of the resonator or resonators and is tube-like before reflection
2225/28 . . . in which the electron stream is perpendicular to the axis of the resonator or resonators and is pencil-like before reflection
2225/30 . . . in which the electron stream is perpendicular to the axis of the resonator or resonators and is radial or disc-like before reflection
2225/32 . . Tubes with plural reflection, e.g. Coeterier tube
2225/34 . Travelling-wave tubes; Tubes in which a travelling wave is simulated at spaced gaps
2225/36 . . Tubes in which an electron stream interacts with a wave travelling along a delay line or equivalent sequence of impedance elements, and without magnet system producing an H-field crossing the E-field
2225/38 . . . the forward travelling wave being utilised
2225/40 . . . the backward travelling wave being utilised
2225/42 . . Tubes in which an electron stream interacts with a wave travelling along a delay line or equivalent sequence of impedance elements, and with a magnet system producing an H-field crossing the E-field
2225/44 . . . the forward travelling wave being utilised
2225/46 . . . the backward travelling wave being utilised
2225/48 . . Tubes in which two electron streams of different velocities interact with one another, e.g. electron-wave tube
2225/49 . . Tubes using the parametric principle, e.g. for parametric amplification
2225/50 . Magnetrons, i.e. tubes with a magnet system producing an H-field crossing the E-field
2225/52 . . with an electron space having a shape that does not prevent any electron from moving completely around the cathode or guide electrode
2225/54 . . . having only one cavity or other resonator, e.g. neutrode tube
2225/55 . . . . Coaxial cavity magnetrons
2225/56 . . . . with interdigital arrangements of anodes, e.g. turbator tube
2225/58 . . . having a number of resonators; having a composite resonator, e.g. a helix
2225/587 . . . . Multi-cavity magnetrons
2225/593 . . . . . Rising-sun magnetrons
2225/60 . . with an electron space having a shape that prevents any electron from moving completely around the cathode or guide electrode; Linear magnetrons
2225/61 . Hybrid tubes, i.e. tubes comprising a klystron section and a travelling-wave section
2225/62 . Strophotrons, i.e. tubes with H-field crossing the E-field and functioning with plural reflection
2225/64 . Turbine tubes, i.e. tubes with H-field crossing the E-field and functioning with reversed cyclotron action
2225/66 . Tubes with electron stream crossing itself and thereby interacting or interfering with itself
2225/68 . Tubes specially designed to act as oscillator with positive grid and retarding field, e.g. for Barkhausen-Kurz oscillators
2225/70 . . with resonator having distributed inductance with capacitance, e.g. Pintsch tube
2225/72 . . in which a standing wave or a considerable part thereof is produced along an electrode, e.g. Clavier tube
2225/74 . Tubes specially designed to act as transit-time diode oscillators, e.g. monotron
2225/76 . Dynamic electron-multiplier tubes, e.g. Farnsworth multiplier tube, multipactor

2225/78 . Tubes with electron stream modulated by deflection in a resonator

2229/00 Details of cathode ray tubes or electron beam tubes (H01J 2329/00 takes precedence)

2229/0007 . Elimination of unwanted or stray electromagnetic effects
2229/0015 . . Preventing or cancelling fields leaving the enclosure
2229/0023 . . . Passive means
2229/003 . . Preventing or cancelling fields entering the enclosure
2229/0038 . . . Active means
2229/0046 . . Preventing or cancelling fields within the enclosure
2229/0053 . . . Demagnetisation
2229/0061 . Cooling arrangements
2229/0069 . . Active means, e.g. fluid flow
2229/0076 . . . applied to the faceplate
2229/0084 . . . . Translucent coolant, e.g. flowing across faceplate
2229/0092 . . Passive means, e.g. fins, heat conductors
2229/07 . Shadow masks
2229/0705 . . Mounting arrangement of assembly to vessel
2229/0711 . . . Spring and plate (clip) type
2229/0716 . . Mounting arrangements of aperture plate to frame or vessel
2229/0722 . . Frame
2229/0727 . . Aperture plate
2229/0733 . . . characterised by the material
2229/0738 . . . Mitigating undesirable mechanical effects
2229/0744 . . . . Vibrations
2229/075 . . . Beam passing apertures, e.g. geometrical arrangements
2229/0755 . . . . characterised by aperture shape
2229/0761 . . . . . Uniaxial masks having parallel slit apertures, i.e. Trinitron type
2229/0766 . . . Details of skirt or border
2229/0772 . . . . Apertures, cut-outs, depressions, or the like
2229/0777 . . . Coatings
2229/0783 . . . . improving thermal radiation properties
2229/0788 . . . Parameterised dimensions of aperture plate, e.g. relationships, polynomial expressions
2229/0794 . . Geometrical arrangements, e.g. curvature
2229/18 . Phosphor screens
2229/183 . . multi-layer
2229/186 . . Geometrical arrangement of phosphors
2229/48 . Electron guns
2229/4803 . . Electrodes
2229/4806 . . . Shield centering cups
2229/481 . . . Focusing electrodes
2229/4813 . . . . Pre-focusing
2229/4817 . . . Accelerating electrodes
2229/482 . . . Extraction grids
2229/4824 . . Constructional arrangements of electrodes
2229/4827 . . . Electrodes formed on surface of common cylindrical support
2229/4831 . . . Electrode supports
2229/4834 . . Electrical arrangements coupled to electrodes, e.g. potentials
2229/4837 . . . characterised by the potentials applied
2229/4841 . . . . Dynamic potentials
2229/4844 . . characterised by beam passing apertures or combinations
2229/4848 . . . Aperture shape as viewed along beam axis
2229/4851 . . . . trapezoidal
2229/4855 . . . . . with rounded end or ends
2229/4858 . . . . parallelogram
2229/4862 . . . . . square
2229/4865 . . . . . rectangle
2229/4868 . . . . . with rounded end or ends
2229/4872 . . . . circular
2229/4875 . . . . oval
2229/4879 . . . . non-symmetric about field scanning axis
2229/4882 . . . . non-symmetric about line scanning axis
2229/4886 . . . . polygonal
2229/4889 . . . . . cross shaped
2229/4893 . . . . Interconnected apertures
2229/4896 . . . . complex and not provided for
2229/50 . . Plurality of guns or beams
2229/502 . . . Three beam guns, e.g. for colour CRTs
2229/505 . . . Arrays
2229/507 . . . Multi-beam groups, e.g. number of beams greater than number of cathodes
2229/56 . Correction of beam optics
2229/563 . . Aberrations by type
2229/5632 . . . Spherical
2229/5635 . . . Astigmatism
2229/5637 . . . Colour purity
2229/568 . . using supplementary correction devices
2229/5681 . . . magnetic
2229/5682 . . . . Permanently magnetised materials, e.g. permanent magnets
2229/5684 . . . . Magnetic materials, e.g. soft iron
2229/5685 . . . . . Cross-arms field shaper
2229/5687 . . . . Auxiliary coils
2229/5688 . . . . . Velocity modulation
2229/58 . Electron beam control inside the vessel
2229/581 . . by magnetic means
2229/582 . . by electrostatic means
2229/583 . . at the source
2229/5835 . . . cooperating with the electron gun
2229/585 . . at the screen
2229/587 . . between the source and the screen
2229/70 . Electron beam control outside the vessel
2229/703 . . by magnetic fields
2229/7031 . . . Cores for field producing elements, e.g. ferrite
2229/7032 . . . Conductor design and distribution
2229/7033 . . . . Winding
2229/7035 . . . . Wires and conductors
2229/7036 . . . . . Form of conductor
2229/7037 . . . . . flat, e.g. foil, or ribbon type
2229/7038 . . . Coil separators and formers
2229/86 . Vessels and containers
2229/8603 . . Neck or cone portions of the CRT vessel
2229/8606 . . . characterised by the shape
2229/8609 . . . . Non circular cross-sections
2229/8613 . . Faceplates
2229/8616 . . . characterised by shape
2229/862 . . . . Parameterised shape, e.g. expression, relationship or equation
2229/8623 . . Substrates
2229/8626 . . Frames
2229/863 . Passive shielding means associated with the vessel

2229/8631 . . Coatings
2229/8632 . . . characterised by the material
2229/8633 . . Meshes and patterns
2229/8634 . . Magnetic shielding
2229/8635 . . Antistatic shielding
2229/8636 . . Electromagnetic shielding
2229/8637 . . Mechanical shielding, e.g. against water or abrasion
2229/8638 . . Ionising radiation shielding, e.g. X-rays
2229/87 . Means for avoiding vessel implosion
2229/875 . . Means substantially covering the output face, e.g. resin layers, protective panels
2229/88 . Coatings
2229/882 . . having particular electrical resistive or conductive properties
2229/885 . . having particular electrical insulation properties
2229/887 . . having particular X-ray shielding properties
2229/89 . Optical components associated with the vessel
2229/8901 . . Fixing of optical components to the vessel
2229/8903 . . Fibre optic components
2229/8905 . . Direction sensitive devices for controlled viewing angle
2229/8907 . . Image projection devices
2229/8909 . . Baffles, shutters, apertures or the like against external light
2229/8911 . . . Large-scale devices, e.g. foldable screens
2229/8913 . . Anti-reflection, anti-glare, viewing angle and contrast improving treatments or devices
2229/8915 . . . Surface treatment of vessel or device, e.g. controlled surface roughness
2229/8916 . . . inside the vessel
2229/8918 . . . by using interference effects
2229/892 . . . Effect varying over surface
2229/8922 . . . Apparatus attached to vessel and not integral therewith
2229/8924 . . having particular properties for protecting the vessel, e.g. against abrasion, water or shock
2229/8926 . . Active components, e.g. LCD's, indicators, illuminators and moving devices
2229/8928 . . Laser CRTs
2229/893 . . using lenses
2229/899 . . Photographic devices (permanent recording of images)
2229/92 . Means providing or assisting electrical connection with or within the tube
2229/922 . . within the tube
2229/925 . . associated with the high tension [HT], e.g. anode potentials
2229/927 . . associated with digital scanning
2229/94 . Means for obtaining or maintaining the desired pressure within the tube
2229/96 . Circuit elements other than coils, reactors or the like, associated with the tube
2229/962 . . associated with the HT
2229/964 . . associated with the deflection system
2229/966 . . associated with the gun structure
2229/968 . . . Resistors

2231/00 Cathode ray tubes or electron beam tubes
(H01J 2329/00 takes precedence)

2231/12 . CRTs having luminescent screens
2231/121 . . Means for indicating the position of the beam, e.g. beam indexing
2231/123 . . . by direct current detection, e.g. collecting electrodes
2231/125 . . with a plurality of electron guns within the tube envelope
2231/1255 . . . two or more neck portions containing one or more guns
2231/50 . Imaging and conversion tubes
2231/50005 . . characterised by form of illumination
2231/5001 . . . Photons
2231/50015 . . . . Light
2231/50021 . . . . . Ultraviolet
2231/50026 . . . . . Infrared
2231/50031 . . . . High energy photons
2231/50036 . . . . . X-rays
2231/50042 . . . Particles
2231/50047 . . . . Charged particles
2231/50052 . . . Mechanical vibrations, e.g. sound
2231/50057 . . characterised by form of output stage
2231/50063 . . . Optical
2231/50068 . . . Electrical
2231/50073 . . . . Charge coupled device [CCD]
2231/50078 . . . . Resistive anode
2231/50084 . . . . using light or electron beam scanning
2231/50089 . . . Having optical stage before electrical conversion
2231/50094 . . . . Charge coupled device [CCD]
2231/501 . . including multiplication stage
2231/5013 . . . with secondary emission electrodes
2231/5016 . . . . Michrochannel plates [MCP]
2231/503 . . with scanning or gating optics
2231/5033 . . . electrostatic
2231/5036 . . . magnetic
2231/505 . . with non-scanning optics
2231/5053 . . . electrostatic
2231/5056 . . . magnetic

2235/00 X-ray tubes

2235/02 . Electrical arrangements
2235/023 . . Connecting of signals or tensions to or through the vessel
2235/0233 . . . High tension
2235/0236 . . . Indirect coupling, e.g. capacitive or inductive
2235/06 . Cathode assembly
2235/062 . . Cold cathodes
2235/064 . . Movement of cathode
2235/066 . . . Rotation
2235/068 . . Multi-cathode assembly
2235/08 . Targets (anodes) and X-ray converters
2235/081 . . Target material
2235/082 . . . Fluids, e.g. liquids, gases
2235/083 . . Bonding or fixing with the support or substrate
2235/084 . . . Target-substrate interlayers or structures, e.g. to control or prevent diffusion or improve adhesion
2235/085 . . Target treatment, e.g. ageing, heating
2235/086 . . Target geometry
2235/088 . . Laminated targets, e.g. plurality of emitting layers of unique or differing materials
2235/10 . Drive means for anode (target) substrate
2235/1006 . . Supports or shafts for target or substrate
2235/1013 . . . Fixing to the target or substrate
2235/102 . . . Materials for the shaft

2235/1026 . . Means (motors) for driving the target (anode)
2235/1033 . . . mounted within the vacuum vessel
2235/104 . . . characterised by the shape
2235/1046 . . Bearings and bearing contact surfaces
2235/1053 . . . Retainers or races
2235/106 . . . Dynamic pressure bearings, e.g. helical groove type
2235/1066 . . . Treated contact surfaces, e.g. coatings
2235/1073 . . . Magnetic bearings
2235/108 . . Lubricants
2235/1086 . . . liquid metals
2235/1093 . . Measures for preventing vibration
2235/12 . Cooling
2235/1204 . . of the anode
2235/1208 . . of the bearing assembly
2235/1212 . . of the cathode
2235/1216 . . of the vessel
2235/122 . . of the window
2235/1225 . . characterised by method
2235/1229 . . . employing layers with high emissivity
2235/1233 . . . . characterised by the material
2235/1237 . . . . . Oxides
2235/1241 . . . . Bonding layer to substrate
2235/1245 . . . Increasing emissive surface area
2235/125 . . . . with interdigitated fins or slots
2235/1254 . . . . with microscopic surface features
2235/1258 . . . Placing objects in close proximity
2235/1262 . . . Circulating fluids
2235/1266 . . . . flow being via moving conduit or shaft
2235/127 . . . . Control of flow
2235/1275 . . . . characterised by the fluid
2235/1279 . . . . . Liquid metals
2235/1283 . . . . in conjunction with extended surfaces (e.g. fins or ridges)
2235/1287 . . . . Heat pipes
2235/1291 . . . Thermal conductivity
2235/1295 . . . . Contact between conducting bodies
2235/16 . Vessels
2235/161 . . Non-stationary vessels
2235/162 . . . Rotation
2235/163 . . shaped for a particular application
2235/164 . . . Small cross-section, e.g. for entering in a body cavity
2235/165 . . Shielding arrangements
2235/166 . . . against electromagnetic radiation
2235/167 . . . against thermal (heat) energy
2235/168 . . . against charged particles
2235/18 . Windows, e.g. for X-ray transmission
2235/183 . . Multi-layer structures
2235/20 . Arrangements for controlling gases within the X-ray tube
2235/205 . . Gettering

2237/00 Discharge tubes exposing object to beam, e.g. for analysis treatment, etching, imaging

NOTES

1. For features of general interest which may be found in other types of discharge tubes, an indexing code corresponding to general schemes H01J 2201/00 - H01J 2203/00 is given, e.g. for cathodes, vessels, cooling means or the like
2. Same rules apply for manufacturing procedures (H01J 2209/00), unless really specific to the tube concerned.
3. The codes in this main group are grouped according to the following principle:
   details common to gas or plasma discharge of the above mentioned tubes: H01J 2237/00 - H01J 2237/2487
   Imaging or analysing: H01J 2237/25 - H01J 2237/2857
   particle beam processing: H01J 2237/30 - H01J 2237/31798
   plasma processing: H01J 2237/32 - H01J 2237/339

2237/002 . Cooling arrangements
2237/004 . Charge control of objects or beams
2237/0041 . . Neutralising arrangements
2237/0042 . . . Deflection of neutralising particles
2237/0044 . . . of objects being observed or treated
2237/0045 . . . . using secondary electrons
2237/0047 . . . . using electromagnetic radiations, e.g. UV, X-rays, light
2237/0048 . . Charging arrangements
2237/006 . Details of gas supplies, e.g. in an ion source, to a beam line, to a specimen or to a workpiece, (H01J 37/3244 takes precedence; environmental cells for electron microscopes H01J 2237/2003; microscopes with environmental specimen chamber H01J 2237/2608)
2237/02 . Details
2237/0203 . . Protection arrangements
2237/0206 . . . Extinguishing, preventing or controlling unwanted discharges
2237/0209 . . . Avoiding or diminishing effects of eddy currents
2237/0213 . . . Avoiding deleterious effects due to interactions between particles and tube elements
2237/0216 . . Means for avoiding or correcting vibration effects
2237/022 . . Avoiding or removing foreign or contaminating particles, debris or deposits on sample or tube
2237/0225 . . . Detecting or monitoring foreign particles
2237/024 . . Moving components not otherwise provided for
2237/0245 . . . Moving whole optical system relatively to object
2237/026 . . Shields
2237/0262 . . . electrostatic
2237/0264 . . . magnetic
2237/0266 . . . electromagnetic
2237/0268 . . . Liner tubes
2237/028 . . Particle traps
2237/03 . Mounting, supporting, spacing or insulating electrodes
2237/032 . . Mounting or supporting
2237/036 . . Spacing
2237/038 . . Insulating
2237/04 . Means for controlling the discharge
2237/041 . . Beam polarising means
2237/043 . . Beam blanking
2237/0432 . . . High speed and short duration
2237/0435 . . . Multi-aperture
2237/0437 . . . . Semiconductor substrate
2237/045 . . Diaphragms
2237/0451 . . . with fixed aperture

2237/0453 . . . . multiple apertures
2237/0455 . . . with variable aperture
2237/0456 . . . Supports
2237/0458 . . . . movable, i.e. for changing between differently sized apertures
2237/047 . . Changing particle velocity
2237/0473 . . . accelerating
2237/04732 . . . . with magnetic means
2237/04735 . . . . with electrostatic means
2237/04737 . . . . . radio-frequency quadrupole [RFQ]
2237/0475 . . . decelerating
2237/04753 . . . . with magnetic means
2237/04756 . . . . with electrostatic means
2237/049 . . Focusing means
2237/0492 . . . Lens systems
2237/04922 . . . . electromagnetic
2237/04924 . . . . electrostatic
2237/04926 . . . . combined
2237/04928 . . . . Telecentric systems
2237/05 . Arrangements for energy or mass analysis
2237/053 . . electrostatic
2237/0535 . . . Mirror analyser
2237/055 . . magnetic
2237/057 . . Energy or mass filtering
2237/06 . Sources
2237/061 . . Construction
2237/062 . . . Reducing size of gun
2237/063 . . Electron sources
2237/06308 . . . Thermionic sources
2237/06316 . . . . Schottky emission
2237/06325 . . . Cold-cathode sources
2237/06333 . . . . Photo emission
2237/06341 . . . . Field emission
2237/0635 . . . . . Multiple source, e.g. comb or array
2237/06358 . . . . Secondary emission
2237/06366 . . . . Gas discharge electron sources
2237/06375 . . . Arrangement of electrodes
2237/06383 . . . Spin polarised electron sources
2237/06391 . . . Positron sources
2237/065 . . Source emittance characteristics
2237/0653 . . . Intensity
2237/0656 . . . Density
2237/08 . . Ion sources
2237/0802 . . . Field ionization sources
2237/0805 . . . . Liquid metal sources
2237/0807 . . . . Gas field ion sources [GFIS]
2237/081 . . . Sputtering sources
2237/0812 . . . Ionized cluster beam [ICB] sources
2237/0815 . . . Methods of ionisation
2237/0817 . . . . Microwaves
2237/082 . . . . Electron beam
2237/0822 . . . Multiple sources
2237/0825 . . . . for producing different ions simultaneously
2237/0827 . . . . for producing different ions sequentially
2237/083 . . Beam forming
2237/0835 . . . Variable cross-section or shape
2237/10 . Lenses
2237/103 . . characterised by lens type
2237/1035 . . . Immersion lens
2237/12 . . electrostatic
2237/1202 . . . Associated circuits
2237/1205 . . . Microlenses
2237/1207 . . . Einzel lenses
2237/121 . . . characterised by shape
2237/1215 . . . . Annular electrodes
2237/14 . . magnetic
2237/1405 . . . Constructional details
2237/141 . . . . Coils
2237/1415 . . . . Bores or yokes, i.e. magnetic circuit in general
2237/142 . . . with superconducting coils
2237/15 . Means for deflecting or directing discharge
2237/1501 . . Beam alignment means or procedures
2237/1502 . . Mechanical adjustments
2237/1503 . . . Mechanical scanning
2237/1504 . . Associated circuits
2237/1505 . . Rotating beam around optical axis
2237/1506 . . Tilting or rocking beam around an axis substantially at an angle to optical axis
2237/1507 . . . dynamically, e.g. to obtain same impinging angle on whole area
2237/1508 . . Combined electrostatic-electromagnetic means
2237/151 . . Electrostatic means
2237/1512 . . . Travelling wave deflectors
2237/1514 . . . Prisms
2237/1516 . . . Multipoles
2237/1518 . . . for X-Y scanning
2237/152 . . Magnetic means
2237/1523 . . . Prisms
2237/1526 . . . For X-Y scanning
2237/153 . Correcting image defects, e.g. stigmators
2237/1532 . . Astigmatism
2237/1534 . . Aberrations
2237/1536 . . Image distortions due to scanning
2237/1538 . . Space charge (Boersch) effect compensation
2237/16 . Vessels
2237/162 . . Open vessel, i.e. one end sealed by object or workpiece
2237/164 . . Particle-permeable windows
2237/166 . . Sealing means
2237/18 . Vacuum control means
2237/182 . . Obtaining or maintaining desired pressure
2237/1825 . . . Evacuating means
2237/184 . . Vacuum locks
2237/186 . . Valves
2237/188 . . Differential pressure
2237/20 . Positioning, supporting, modifying or maintaining the physical state of objects being observed or treated
2237/2001 . . Maintaining constant desired temperature
2237/2002 . . Controlling environment of sample
2237/2003 . . . Environmental cells
2237/2004 . . . . Biological samples
2237/2005 . . Seal mechanisms
2237/2006 . . . Vacuum seals
2237/2007 . . Holding mechanisms
2237/2008 . . specially adapted for studying electrical or magnetical properties of objects
2237/201 . . for mounting multiple objects
2237/202 . . Movement
2237/20207 . . . Tilt
2237/20214 . . . Rotation
2237/20221 . . . Translation

2237/20228 . . . . Mechanical X-Y scanning
2237/20235 . . . . Z movement or adjustment
2237/20242 . . . Eucentric movement
2237/2025 . . . Sensing velocity of translation or rotation
2237/20257 . . . Magnetic coupling
2237/20264 . . . Piezoelectric devices
2237/20271 . . . Temperature responsive devices
2237/20278 . . . Motorised movement
2237/20285 . . . . computer-controlled
2237/20292 . . . Means for position and/or orientation registration
2237/204 . . Means for introducing and/or outputting objects
2237/206 . . Modifying objects while observing
2237/2062 . . . Mechanical constraints
2237/2065 . . . Temperature variations
2237/2067 . . . Surface alteration
2237/208 . . Elements or methods for movement independent of sample stage for influencing or moving or contacting or transferring the sample or parts thereof, e.g. prober needles or transfer needles in FIB/SEM systems
2237/21 . Focus adjustment
2237/213 . . during electron or ion beam welding or cutting
2237/216 . . Automatic focusing methods
2237/22 . Treatment of data
2237/221 . . Image processing
2237/223 . . . Fourier techniques
2237/225 . . . Displaying image using synthesised colours
2237/226 . . Image reconstruction
2237/228 . . . Charged particle holography
2237/244 . Detection characterized by the detecting means
2237/24405 . . Faraday cages
2237/2441 . . Semiconductor detectors, e.g. diodes
2237/24415 . . . X-ray
2237/2442 . . . . Energy-dispersive (Si-Li type) spectrometer
2237/24425 . . . . Wavelength-dispersive spectrometer
2237/2443 . . Scintillation detectors
2237/24435 . . Microchannel plates
2237/2444 . . Electron Multiplier
2237/24445 . . . using avalanche in a gas
2237/2445 . . Photon detectors for X-rays, light, e.g. photomultipliers
2237/24455 . . Transmitted particle detectors
2237/2446 . . Position sensitive detectors
2237/24465 . . . Sectored detectors, e.g. quadrants
2237/2447 . . . Imaging plates
2237/24475 . . Scattered electron detectors
2237/2448 . . Secondary particle detectors
2237/24485 . . Energy spectrometers
2237/2449 . . Detector devices with moving charges in electric or magnetic fields
2237/24495 . . Signal processing, e.g. mixing of two or more signals
2237/245 . Detection characterised by the variable being measured
2237/24507 . . Intensity, dose or other characteristics of particle beams or electromagnetic radiation
2237/24514 . . . Beam diagnostics including control of the parameter or property diagnosed (H01J 2237/30472 takes precedence)
2237/24521 . . . . Beam diameter
2237/24528 . . . . Direction of beam or parts thereof in view of the optical axis, e.g. beam angle, angular distribution, beam divergence, beam convergence or beam landing angle on sample or workpiece
2237/24535 . . . . Beam current
2237/24542 . . . . Beam profile
2237/2455 . . . Polarisation (electromagnetic beams)
2237/24557 . . . Spin polarisation (particles)
2237/24564 . . Measurements of electric or magnetic variables, e.g. voltage, current, frequency
2237/24571 . . Measurements of non-electric or non-magnetic variables
2237/24578 . . . Spatial variables, e.g. position, distance
2237/24585 . . . Other variables, e.g. energy, mass, velocity, time, temperature
2237/24592 . . Inspection and quality control of devices
2237/248 . Components associated with the control of the tube
2237/2482 . . Optical means
2237/2485 . . Electric or electronic means
2237/2487 . . . using digital signal processors
2237/25 . Tubes for localised analysis using electron or ion beams
2237/2505 . . characterised by their application
2237/2511 . . . Auger spectrometers
2237/2516 . . . Secondary particles mass or energy spectrometry
2237/2522 . . . . of electrons (ESCA, XPS)
2237/2527 . . . . Ions [SIMS]
2237/2533 . . . . Neutrals [SNMS]
2237/2538 . . . Low energy electron microscopy [LEEM]
2237/2544 . . . . Diffraction [LEED]
2237/255 . . . . . Reflection diffraction [RHEED]
2237/2555 . . . Microprobes, i.e. particle-induced X-ray spectrometry
2237/2561 . . . . electron
2237/2566 . . . . ion
2237/2572 . . . . proton
2237/2577 . . . . atomic
2237/2583 . . . using tunnel effects, e.g. STM, AFM
2237/2588 . . . Lorenz microscopy (magnetic field measurement)
2237/2594 . . . Measuring electric fields or potentials
2237/26 . Electron or ion microscopes
2237/2602 . . Details
2237/2605 . . . operating at elevated pressures, e.g. atmosphere
2237/2608 . . . . with environmental specimen chamber
2237/2611 . . Stereoscopic measurements and/or imaging
2237/2614 . . Holography or phase contrast, phase related imaging in general, e.g. phase plates
2237/2617 . . Comparison or superposition of transmission images; Moiré
2237/262 . . Non-scanning techniques
2237/2623 . . . Field-emission microscopes
2237/2626 . . . . Pulsed source
2237/28 . . Scanning microscopes
2237/2801 . . . Details
2237/2802 . . . Transmission microscopes
2237/2803 . . . characterised by the imaging method
2237/2804 . . . . Scattered primary beam
2237/2805 . . . . . Elastic scattering
2237/2806 . . . . Secondary charged particle

2237/2807 . . . . X-rays
2237/2808 . . . . Cathodoluminescence
2237/2809 . . . characterised by the imaging problems involved
2237/281 . . . . Bottom of trenches or holes
2237/2811 . . . . Large objects
2237/2812 . . . Emission microscopes
2237/2813 . . . characterised by the application
2237/2814 . . . . Measurement of surface topography
2237/2815 . . . . . Depth profile
2237/2816 . . . . . Length
2237/2817 . . . . Pattern inspection
2237/2818 . . . Scanning tunnelling microscopes
2237/282 . . Determination of microscope properties
2237/2823 . . . Resolution
2237/2826 . . . Calibration
2237/285 . . Emission microscopes
2237/2852 . . . Auto-emission (i.e. field-emission)
2237/2855 . . . Photo-emission
2237/2857 . . . Particle bombardment induced emission
2237/30 . Electron or ion beam tubes for processing objects
2237/303 . . Electron or ion optical systems
2237/304 . . Controlling tubes
2237/30405 . . . Details
2237/30411 . . . . using digital signal processors [DSP]
2237/30416 . . . . Handling of data
2237/30422 . . . . . Data compression
2237/30427 . . . . using neural networks or fuzzy logic
2237/30433 . . . System calibration
2237/30438 . . . . Registration
2237/30444 . . . . . Calibration grids
2237/3045 . . . . Deflection calibration
2237/30455 . . . Correction during exposure
2237/30461 . . . . pre-calculated
2237/30466 . . . Detecting endpoint of process
2237/30472 . . . Controlling the beam
2237/30477 . . . . Beam diameter
2237/30483 . . . . Scanning
2237/30488 . . . . . Raster scan
2237/30494 . . . . . Vector scan
2237/31 . . Processing objects on a macro-scale
2237/3104 . . . Welding
2237/3109 . . . Cutting
2237/3114 . . . Machining
2237/3118 . . . Drilling
2237/3123 . . . Casting
2237/3128 . . . Melting
2237/3132 . . . Evaporating
2237/3137 . . . . Plasma-assisted co-operation
2237/3142 . . . Ion plating
2237/3146 . . . . Ion beam bombardment sputtering
2237/3151 . . . Etching
2237/3156 . . . Curing
2237/316 . . . Changing physical properties
2237/3165 . . . Changing chemical properties
2237/317 . . Processing objects on a microscale
2237/31701 . . . Ion implantation
2237/31703 . . . . Dosimetry
2237/31705 . . . . Impurity or contaminant control
2237/31706 . . . . characterised by the area treated
2237/31708 . . . . . unpatterned
2237/3171 . . . . . patterned
2237/31711 . . . . . using mask
2237/31713 . . . . . Focused ion beam
2237/31732 . . . Depositing thin layers on selected microareas
2237/31733 . . . . using STM
2237/31735 . . . Direct-write microstructures
2237/31737 . . . . using ions
2237/31738 . . . . using STM
2237/3174 . . . Etching microareas
2237/31742 . . . . for repairing masks
2237/31744 . . . . . introducing gas in vicinity of workpiece
2237/31745 . . . . for preparing specimen to be viewed in microscopes or analyzed in microanalysers
2237/31747 . . . . using STM
2237/31749 . . . Focused ion beam
2237/3175 . . . Lithography
2237/31752 . . . . using particular beams or near-field effects, e.g. STM-like techniques
2237/31754 . . . . . using electron beams
2237/31755 . . . . . using ion beams
2237/31757 . . . . . hybrid, i.e. charged particles and light, X-rays, plasma
2237/31759 . . . . . using near-field effects, e.g. STM
2237/31761 . . . . Patterning strategy
2237/31762 . . . . . Computer and memory organisation
2237/31764 . . . . . Dividing into sub-patterns
2237/31766 . . . . . Continuous moving of wafer
2237/31767 . . . . . Step and repeat
2237/31769 . . . . Proximity effect correction
2237/31771 . . . . . using multiple exposure
2237/31772 . . . . Flood beam
2237/31774 . . . . Multi-beam
2237/31776 . . . . Shaped beam
2237/31777 . . . . by projection
2237/31779 . . . . . from patterned photocathode
2237/31781 . . . . . from patterned cold cathode
2237/31783 . . . . . M-I-M cathode
2237/31784 . . . . . Semiconductor cathode
2237/31786 . . . . . Field-emitting cathode
2237/31788 . . . . . through mask
2237/31789 . . . . . Reflection mask
2237/31791 . . . . . Scattering mask
2237/31793 . . . . Problems associated with lithography
2237/31794 . . . . . affecting masks
2237/31796 . . . . . affecting resists
2237/31798 . . . . . detecting pattern defects
2237/32 . Processing objects by plasma generation
2237/327 . . Arrangements for generating the plasma
2237/33 . . characterised by the type of processing
2237/332 . . . Coating
2237/3321 . . . . CVD [Chemical Vapor Deposition]
2237/3322 . . . . Problems associated with coating
2237/3323 . . . . . uniformity
2237/3325 . . . . . large area
2237/3326 . . . . . high speed
2237/3327 . . . . . Coating high aspect ratio workpieces
2237/3328 . . . . . adhesion, stress, lift-off of deposited films
2237/334 . . . Etching
2237/3341 . . . . Reactive etching
2237/3342 . . . . Resist stripping
2237/3343 . . . . Problems associated with etching

2237/3344 . . . . . isotropy
2237/3345 . . . . . anisotropy
2237/3346 . . . . . Selectivity
2237/3347 . . . . . bottom of holes or trenches
2237/3348 . . . . . control of ion bombardment energy
2237/335 . . . Cleaning
2237/3355 . . . . Holes or apertures, i.e. inprinted circuit boards
2237/336 . . . Changing physical properties of treated surfaces
2237/3365 . . . . Plasma source implantation
2237/338 . . . Changing chemical properties of treated surfaces
2237/3382 . . . . Polymerising
2237/3385 . . . . Carburising
2237/3387 . . . . Nitriding
2237/339 . . . Synthesising components

Details

2261/00 Gas- or vapour-discharge lamps
2261/02 . Details
2261/38 . . Devices for influencing the colour or wavelength of the light
2261/385 . . . Non-chemical aspects of luminescent layers, e.g. thickness profile, shape and distribution of luminescent coatings

2329/00 Electron emission display panels, e.g. field emission display panels
2329/002 . Cooling means
2329/005 . Multi-directional displaying, i.e. with multiple display faces facing in different directions
2329/007 . Vacuumless display panels, i.e. with phosphor directly applied to emitter without intermediate vacuum space
2329/02 . Electrodes other than control electrodes
2329/04 . . Cathode electrodes
2329/0402 . . . Thermionic cathodes
2329/0405 . . . Cold cathodes other than those covered by H01J 2329/0407 - H01J 2329/0492
2329/0407 . . . Field emission cathodes
2329/041 . . . . characterised by the emitter shape
2329/0413 . . . . . Microengineered point emitters
2329/0415 . . . . . conical shaped, e.g. Spindt type
2329/0418 . . . . . needle shaped
2329/0421 . . . . . Pillar shaped emitters
2329/0423 . . . . . Microengineered edge emitters
2329/0426 . . . . . Coatings on the emitter surface, e.g. with low work function materials
2329/0428 . . . . . Fibres
2329/0431 . . . . . Nanotubes
2329/0434 . . . . . Particles
2329/0436 . . . . . Whiskers
2329/0439 . . . . characterised by the emitter material
2329/0442 . . . . . Metals or metal alloys
2329/0444 . . . . . Carbon types
2329/0447 . . . . . Diamond
2329/0449 . . . . . Graphite
2329/0452 . . . . . Fullerenes
2329/0455 . . . . . Carbon nanotubes (CNTs)
2329/0457 . . . . . Amorphous carbon
2329/046 . . . . . Diamond-like carbon [DLC]
2329/0463 . . . . . Semiconductor materials
2329/0465 . . . . . Carbides
2329/0468 . . . . . Nitrides
2329/0471 . . . . . Borides
2329/0473 . . . . . Oxides
2329/0476 . . . Ferroelectric cathodes
2329/0478 . . . Semiconductor cathodes, e.g. having PN junction layers
2329/0481 . . . Cold cathodes having an electric field perpendicular to the surface thereof (H01J 2329/0407 - H01J 2329/0478 take precedence)
2329/0484 . . . . Metal-Insulator-Metal [MIM] emission type cathodes
2329/0486 . . . Cold cathodes having an electric field parallel to the surface thereof, e.g. thin film cathodes
2329/0489 . . . . Surface conduction emission type cathodes
2329/0492 . . . Cold cathodes combined with other synergetic effects, e.g. secondary, photo- or thermal emission
2329/0494 . . . Circuit elements associated with the emitters by direct integration
2329/0497 . . . . Resistive members, e.g. resistive layers
2329/08 . . Anode electrodes
2329/18 . Luminescent screens
2329/20 . . characterised by the luminescent material
2329/22 . . characterised by the binder or adhesive for securing the luminescent material to its support, e.g. substrate
2329/28 . . with protective, conductive or reflective layers
2329/30 . . Shape or geometrical arrangement of the luminescent material
2329/32 . . Means associated with discontinuous arrangements of the luminescent material
2329/323 . . . Black matrix
2329/326 . . . Color filters structurally combined with the luminescent material
2329/46 . Arrangements of electrodes and associated parts for generating or controlling the electron beams
2329/4604 . . Control electrodes
2329/4608 . . . Gate electrodes
2329/4613 . . . . characterised by the form or structure
2329/4617 . . . . . Shapes or dimensions of gate openings
2329/4621 . . . . . Arrangement of gate openings
2329/4626 . . . . . Curved or extending upwardly
2329/463 . . . . characterised by the material
2329/4634 . . . . Relative position to the emitters, cathodes or substrates
2329/4639 . . . Focusing electrodes
2329/4643 . . . . characterised by the form or structure
2329/4647 . . . . . Shapes or dimensions of focusing electrode openings
2329/4652 . . . . . Arrangement of focusing electrode openings
2329/4656 . . . . characterised by the material
2329/466 . . . . Relative position to the gate electrodes, emitters, cathodes or substrates
2329/4665 . . . . . In the same plane as the gate electrodes or cathodes
2329/4669 . . Insulation layers
2329/4673 . . . for gate electrodes
2329/4678 . . . for focusing electrodes
2329/4682 . . . characterised by the shape

2329/4686 . . . . Dimensions of openings
2329/4691 . . . characterised by the material
2329/4695 . . Potentials applied to the electrodes
2329/86 . Vessels
2329/8605 . . Front or back plates
2329/861 . . . characterised by the shape
2329/8615 . . . characterised by the material
2329/862 . . Frames
2329/8625 . . Spacing members
2329/863 . . . characterised by the form or structure
2329/8635 . . . . having a corrugated lateral surface
2329/864 . . . characterised by the material
2329/8645 . . . with coatings on the lateral surfaces thereof
2329/865 . . . Connection of the spacing members to the substrates or electrodes
2329/8655 . . . . Conductive or resistive layers
2329/866 . . . . Adhesives
2329/8665 . . . Spacer holding means
2329/867 . . Seals between parts of vessels
2329/8675 . . . Seals between the frame and the front and/or back plate
2329/868 . . Passive shielding means of vessels
2329/8685 . . . Antistatic shielding
2329/869 . . . Electromagnetic shielding
2329/8695 . . . Mechanical shielding, e.g. against water or abrasion
2329/88 . . Coatings on walls of the vessels (H01J 2329/18, H01J 2329/868, H01J 2329/89 take precedence)
2329/89 . . Optical components structurally combined with the vessel
2329/892 . . . Anti-reflection, anti-glare, viewing angle and contrast improving means
2329/895 . . . Spectral filters
2329/897 . . . Lenses
2329/90 . Leading-in arrangements; seals therefor
2329/92 . Means forming part of the display panel for the purpose of providing electrical connection to it
2329/94 . Means for exhausting the vessel or maintaining vacuum within the vessel
2329/941 . . Means for exhausting the vessel
2329/943 . . Means for maintaining vacuum within the vessel
2329/945 . . . by gettering
2329/946 . . . . characterised by the position or form of the getter
2329/948 . . . . characterised by the material of the getter
2329/96 . Circuit elements structurally associated with the display panels (H01J 2329/0494 takes precedence)

2893/00 Discharge tubes and lamps

2893/0001 . Electrodes and electrode systems suitable for discharge tubes or lamps
2893/0002 . . Construction arrangements of electrode systems
2893/0003 . . . Anodes forming part of vessel walls
2893/0004 . . . . Anodes formed in central part
2893/0005 . . . Fixing of electrodes
2893/0006 . . . . Mounting
2893/0007 . . . . . Machines for assembly
2893/0008 . . . . Supply leads; Electrode supports via rigid connection to vessel
2893/0009 . . . . Electrode system pressing against vessel wall
2893/001 . . Non-constructive schematic arrangements
2893/0011 . . Non-emitting electrodes
2893/0012 . . Constructional arrangements
2893/0013 . . . Sealed electrodes
2893/0015 . . . Non-sealed electrodes
2893/0016 . . . . Planar grids
2893/0017 . . . . Cylindrical, helical or annular grids
2893/0018 . . . . Bar or cage-like grids
2893/0019 . . . Chemical composition and manufacture
2893/002 . . . . chemical
2893/0021 . . . . . carbon
2893/0022 . . . . Manufacture
2893/0023 . . . . . carbonising and other surface treatments
2893/0024 . . . . . Planar grids
2893/0025 . . . . . by winding wire upon a support
2893/0026 . . . Machines for manufacture of grids or anodes
2893/0027 . . . Mitigation of temperature effects
2893/0029 . Electron beam tubes
2893/003 . Tubes with plural electrode systems
2893/0031 . Tubes with material luminescing under electron bombardment
2893/0032 . Tubes with variable amplification factor
2893/0033 . Vacuum connection techniques applicable to discharge tubes and lamps
2893/0034 . . Lamp bases
2893/0035 . . . shaped as flat plates, in particular metallic
2893/0036 . . . having wires, ribbons or tubes placed between two vessel walls and being perpendicular to at least one of said walls
2893/0037 . . Solid sealing members other than lamp bases
2893/0038 . . . Direct connection between two insulating elements, in particular via glass material
2893/0039 . . . . Glass-to-glass connection, e.g. by soldering
2893/004 . . . . Quartz-to-quartz connection
2893/0041 . . . Direct connection between insulating and metal elements, in particular via glass material
2893/0043 . . . . Glass-to-metal or quartz-to-metal, e.g. by soldering
2893/0044 . . . Direct connection between two metal elements, in particular via material a connecting material
2893/0045 . . Non-solid connections, e.g. liquid or rubber
2893/0046 . . Lamp base with closure
2893/0047 . . Closure other than lamp base
2893/0048 . Tubes with a main cathode
2893/0049 . . Internal parts
2893/005 . . Cathodes
2893/0051 . . Anode assemblies; screens for influencing the discharge
2893/0052 . . . Anode supporting means
2893/0053 . . . Leading in for anodes; Protecting means for anode supports
2893/0054 . . . Cooling means
2893/0055 . . Movable screens
2893/0056 . . Parts inside tubes brought to incandescence by the discharge
2893/0058 . . Grids; Auxiliary internal or external electrodes
2893/0059 . Arc discharge tubes
2893/006 . Tubes with electron bombarded gas (e.g. with plasma filter)
2893/0061 . Tubes with discharge used as electron source
2893/0062 . Tubes with temperature ionized gas as electron source
2893/0063 . Plasma light sources
2893/0064 . Tubes with cold main electrodes (including cold cathodes)

2893/0065 . . Electrode systems
2893/0066 . . . Construction, material, support, protection and temperature regulation of electrodes; Electrode cups
2893/0067 . . . Electrode assembly without control electrodes, e.g. including a screen
2893/0068 . . . electrode assembly with control electrodes, e.g. including a screen
2893/0069 . Tubes for displaying characters
2893/007 . Sequential discharge tubes
2893/0072 . Disassembly or repair of discharge tubes
2893/0073 . . Discharge tubes with liquid poolcathodes; constructional details
2893/0074 . . . Cathodic cups; Screens; Reflectors; Filters; Windows; Protection against mercury deposition; Returning condensed electrode material to the cathodic cup; Liquid electrode level control
2893/0075 . . . . Cathodic cups
2893/0076 . . . . . Liquid electrode materials
2893/0077 . . . . . Cathodic cup construction; Cathodic spot control
2893/0078 . . . . . Mounting cathodic cups in the discharge tube
2893/0079 . . . . . Means for limiting the cathodic spot movement
2893/008 . . . . . Means for stabilising the cathodic spot
2893/0081 . . . . . Cooling means
2893/0082 . . . . Returning condensed electrode material to the cathodic cup, e.g. including cleaning
2893/0083 . . . . Liquid electrode level control
2893/0084 . . . . Protection against mercury deposition
2893/0086 . . . . Gas fill; Maintaining or maintaining desired pressure; Producing, introducing or replenishing gas or vapour during operation of the tube; Getters; Gas cleaning; Electrode cleaning
2893/0087 . . . . Igniting means; Cathode spot maintaining or extinguishing means
2893/0088 . . Tubes with at least a solid principal cathode and solid anodes
2893/0089 . . . Electrode systems
2893/009 . . . Anode systems; Screens
2893/0091 . . . . Anode supporting means
2893/0092 . . . . Anodic screens or grids
2893/0093 . . . . Anodic arms
2893/0094 . . . Electrode arrangements; Auxiliary electrodes
2893/0095 . . Tubes with exclusively liquid main electrodes
2893/0096 . Transport of discharge tube components during manufacture, e.g. wires, coils, lamps, contacts, etc.
2893/0097 . . Incandescent wires of coils
2893/0098 . . Vessels