

## G01J

**MEASUREMENT OF INTENSITY, VELOCITY, SPECTRAL CONTENT, POLARISATION, PHASE OR PULSE CHARACTERISTICS OF INFRA-RED, VISIBLE OR ULTRA-VIOLET LIGHT; COLORIMETRY; RADIATION PYROMETRY (light sources [F21](#), [H01J](#), [H01K](#), [H05B](#); investigating properties of materials by optical means [G01N](#))**

### Definition statement

*This place covers:*

Apparatus or methods for measuring properties of infra-red, visible, or ultra-violet light, for the purpose of:

- Photometry not otherwise provided for ([G01J 1/00](#))
- Spectrometers and spectroscopy per se : measurement of the spectral content of incident light and spectroscopic methods used in this process ([G01J 3/00](#))
- Colorimetry per se ([G01J 3/00](#))
- Measurement of temperature by optical means (remote detection of infrared radiation, non-contact) ([G01J 5/00](#))
- Polarimeters and polarimetry per se : passive measurement of the state of polarisation of incident light ([G01J 4/00](#))
- Measurement of the velocity of light ([G01J 7/00](#))
- Measurement of optical phase differences : wavefront and coherence measurements ([G01J 9/00](#))
- Measurement of the wavelength of incident light ([G01J 9/00](#))
- Measurement of the characteristics of ultrashort pulses ([G01J 11/00](#))

### Relationships with other classification places

[G01J](#) relates in general to the passive optical detection per se of the quantities referred to in the Definition Statement. Measuring arrangements having a configuration dictated by the particular type of sample being investigated (for example spectrophotometer units adapted to scan articles spread over the whole width of a conveyor belt), as well as the corresponding methods, are a subject-matter to be found and classified in the corresponding (application-related) fields.

Optical arrangements occur in many areas of technology. To avoid unnecessary double classification, optical systems and instruments for which specific entries exist elsewhere (for example interferometers, gas analyzers or optical elements per se) are not generally given a secondary class in [G01J](#). Exceptionally, where a feature of general interest for [G01J](#) is disclosed, such a secondary class may be given.

### References

#### Limiting references

*This place does not cover:*

Non-optical measurement of temperature	<a href="#">G01K</a>
Gas analyzers	<a href="#">G01N 21/00</a>
Ellipsometry	<a href="#">G01N 21/00</a>
Sample holders or sample preparations leading to an enhanced detection, e.g. SERS substrates	<a href="#">G01N 21/00</a>
Semiconductor multilayer radiation sensors per se (quantum well sensors)	<a href="#">H01L 27/00</a> , <a href="#">H01L 31/00</a>

Stabilization of the wavelength of a laser by means of a feedback loop, without numerical determination of said wavelength	<a href="#">H01S 5/0687</a>
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**Application-oriented references**

*Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:*

Measuring length, thickness or similar linear dimensions by optical means; Instruments therefor	<a href="#">G01B 11/00</a> , <a href="#">G01B 9/00</a>
Investigating or analysing materials by optical means	<a href="#">G01N 21/00</a>
Prospecting or detecting by optical means	<a href="#">G01V 8/00</a>
Controlling or varying light intensity, spectral composition or exposure time in photographic printing apparatus	<a href="#">G03B 27/72</a>
Exposure in photomechanical, e.g. photolithographic, production of textured or patterned surfaces, e.g. printing surfaces	<a href="#">G03F 7/20</a>

**Informative references**

*Attention is drawn to the following places, which may be of interest for search:*

Apparatus for testing or examining the human eyes	<a href="#">A61B 3/00</a>
Colour determination, selection, or synthesis in painting or artistic drawing, e.g. use of colour tables	<a href="#">B44D 3/00</a>
Light sources	<a href="#">F21</a>
Indicating or recording measured values in general	<a href="#">G01D</a>
Testing of optical apparatus	<a href="#">G01M 11/00</a>
Sunshine-duration recorders	<a href="#">G01W 1/12</a>
Optical elements, systems or apparatus	<a href="#">G02B</a>
Interference filters, gratings, lenses, etc. per se	<a href="#">G02B</a>
Control of light by devices or arrangements the optical operation thereof is modified by changing the optical properties of the medium of the devices or arrangements	<a href="#">G02F 1/00</a>
Control of light in general	<a href="#">G05D 25/00</a>
Mass spectrometry	<a href="#">H01J 49/00</a>
Discharge lamps	<a href="#">H01J 61/00</a> , <a href="#">H01J 63/00</a> , <a href="#">H01J 65/00</a>
Electric incandescent lamps	<a href="#">H01K</a>
Semiconductor devices sensitive to light	<a href="#">H01L 27/14</a> , <a href="#">H01L 31/00</a> , <a href="#">H01L 51/42</a>
Semiconductor devices for light emission, e.g. LEDs	<a href="#">H01L 27/15</a> , <a href="#">H01L 33/00</a> , <a href="#">H01L 51/50</a>
Thermoelectric elements per se	<a href="#">H01L 35/00</a> , <a href="#">H01L 37/00</a>
Lasers	<a href="#">H01S 3/00</a> , <a href="#">H01S 5/00</a>
Electric arc lamps	<a href="#">H05B 31/00</a>
Electroluminescent light sources	<a href="#">H05B 33/00</a>

## Special rules of classification

[G01J](#) comprises Indexing Codes corresponding to EC classes and Indexing Codes corresponding to finer subdivisions of EC classes. Generally speaking, the classification policy in [G01J](#) is to allocate all relevant EC classes and make a correspondingly limited use of Indexing Codes (by opposition to policies in some other fields, where for example a single EC class is given and all other aspects are allocated in the form of Indexing Codes). The limited use of the Indexing Codes in [G01J](#) is defined as follows:

The Indexing Codes corresponding to EC classes (e.g. [G01J 1/04](#), corresponding to EC class [G01J 1/04](#)) should be given to a document which should not have an EC class in [G01J](#) (because it relates primarily to another field) but which describes a side aspect of potential relevance for the subject-matter of the corresponding group (e.g. [G01J 1/04](#)).

Of the Indexing Codes corresponding to finer subdivisions of EC classes, only a limited number is used, because the classification practice has shown that not all of these Indexing Codes are necessary and that a danger of losing in classification consistency exists, due to potential overlaps between these groups. A list of the Indexing Codes (corresponding to finer subdivisions of EC classes) to be used is appended under the headers of each section below ([G01J 1/00](#), [G01J 3/00](#), etc.).

## Glossary of terms

*In this place, the following terms or expressions are used with the meaning indicated:*

Optical	concerning light with wavelengths in the infrared, visible and ultraviolet domains
UV	Ultraviolet
Vis	Visible
NIR	Near Infra Red

## G01J 1/00

**Photometry, e.g. photographic exposure meter (spectrophotometry [G01J 3/00](#); specially adapted for radiation pyrometry [G01J 5/00](#) {; exposure meters built in cameras [G03B 17/06](#)})**

### Definition statement

*This place covers:*

Photometry per se, photodetection principles, solar radiance measurements,

goniophotometry, aspects of integrating sphere measurement theory, standard sources for performing photometry; e.g. relating to exposure meters, scalar irradiance meters, directionally sensitive photodetectors, sunshine monitors, laser power meters, illuminometers, standard flashing lights, domestic lighting measurements, measurement of street lighting.

## References

### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Spectrophotometry	<a href="#">G01J 3/00</a>
Specially adapted for radiation pyrometry	<a href="#">G01J 5/00</a>
Medical goniometers	<a href="#">A61B 5/1071</a>
Solar simulators	<a href="#">F21V 13/08</a> , <a href="#">F21S 8/006</a>

Investigating biological material (sunscreen on skin)	<a href="#">G01N 33/5088</a>
Meteorology/sun light	<a href="#">G01W 1/12</a>
For the control of intensity, phase, colour of light	<a href="#">G05D 25/00</a>

### **Special rules of classification**

In [G01J 1/00](#), the list of Indexing Codes corresponding to finer subdivisions of EC classes and being in use is the following:

[G01J 2001/0276](#)

[G01J 2001/028](#)

[G01J 2001/0285](#)

[G01J 2001/0481](#)

[G01J 2001/0485](#)

[G01J 1/0488](#)

[G01J 1/0492](#)

[G01J 2001/4238](#)

[G01J 2001/4242](#)

[G01J 2001/4247](#)

[G01J 2001/4261](#)

[G01J 2001/4266](#)

[G01J 2001/4406](#)

[G01J 2001/442](#)

[G01J 2001/4426](#)

[G01J 2001/4433](#)

[G01J 2001/444](#)

These Indexing Codes therefore belong to the list of codes which must be considered for use during classification.

The further remaining Indexing Codes, not appearing in this list above, optionally may be considered as well, but these additional codes, being only optional, cannot be considered as a reliable help for search, because they are not complete.

Indexing Code [G01J 2001/4242](#) is used for classifying the aspect of synchronous detection for all apparatuses of [G01J](#).

## G01J 1/02

### Details

#### Definition statement

*This place covers:*

Optical or mechanical details specific to photometry, e.g. relating to removing stray light, photometer field of view determination, pointing of a photometer, housings, user interfaces or display arrangements

## G01J 1/04

### Optical or mechanical part {supplementary adjustable parts}

#### Definition statement

*This place covers:*

Optical or mechanical details of photometers. Optical concentrators, deflectors, attenuators, conical light guides, corrugated diffusers.

#### References

##### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Reflective baffles	<a href="#">G01J 1/0214</a>
Integrating spheres	<a href="#">G01J 2001/0481</a>
Filters, filter glasses	<a href="#">G01J 1/0488</a>
Solar radiation detectors for controlling air-conditioning of a car	<a href="#">B60H 1/0075</a>
Solar radiation detectors for controlling protective blades or dimming	<a href="#">E06B 9/32</a> , <a href="#">F21S 11/00</a> , <a href="#">F21S23/00</a> , <a href="#">H05B 39/04</a> , <a href="#">G05D 25/02</a>
Burglar alarms	<a href="#">G08B 13/00</a> , <a href="#">G01J 5/20</a>

## G01J 1/06

### Restricting the angle of incident light

#### Definition statement

*This place covers:*

Photometers having elements positioned in front of the detector for restricting the angle of incident light.

## G01J 1/08

### Arrangements of light sources specially adapted for photometry {standard sources, also using luminescent or radioactive material}

#### Definition statement

*This place covers:*

Standard light sources, e.g. relating to deuterium lamps, argon arc, tungsten filaments.

## Definition statement

Calibration of photodetectors using these standard sources, e.g. relating to a model sky for calibration and testing, or comparison sources built in photometers for calibrating the latter.

## References

**Limiting references**

*This place does not cover:*

Arrangements of light sources specially adapted for spectrometry - explicitly presented as used for performing spectroscopic or colorimetric analysis	<a href="#">G01J 3/10</a>
Deuterium lamps as such (details about their constitutive elements)	<a href="#">H01J 61/00</a>

**Special rules of classification**

The "arrangements of light sources" are not necessarily for calibration. This group covers documents referring to photometric devices making use of a light source, wherein details of the light source are an important part of the disclosure (for example the way the source itself is built). This is independent from any consideration as to calibration.

In addition, documents referring to the calibration of a light sensor by means of light sources which are able to impinge the detector with known and predetermined amounts of light. These light sources used for calibrating light sensors are particular light sources, and therefore are classified in this group too.

**G01J 1/16**

**using electric radiation detectors ([G01J 1/20](#) takes precedence)**

**Definition statement**

*This place covers:*

Photometers based on a comparison of a value measured through electric radiation detectors with reference light or a reference electric value, e.g. relating to signal processing details, lock in amplifiers, ratio forming circuits, automatic gain control for compensation.

## References

**Limiting references**

*This place does not cover:*

Intensity of the measured or reference value being varied to equalise their effects at the detectors	<a href="#">G01J 1/20</a>
Synchronous detection	<a href="#">G01J 2001/4242</a>
Processing details for spectrometers	<a href="#">G01J 3/28</a>

**G01J 1/1626**

**{Arrangements with two photodetectors, the signals of which are compared}**

**Definition statement**

*This place covers:*

Photometers, light meters, or the like, in which a second detector is used for correction, compensation, or the like.

Series connected pairs of photodiodes, or the like. Differential photometers, ratiometric photometers. AGC (automatic gain control). Automatic exposure control.

## References

### Informative references

Attention is drawn to the following places, which may be of interest for search:

Arrangements with two or more detectors, e.g. for sensitivity compensation	<a href="#">G01J 1/4228</a>
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## G01J 1/18

using comparison with a reference electric value

### Definition statement

*This place covers:*

Compensation for drift of photometers by comparison with standard light sources, voltages, etc. Compensation for dirty lenses, temperature compensation.

## References

### Informative references

Attention is drawn to the following places, which may be of interest for search:

Compensation of spectrometers	<a href="#">G01J 3/28</a>
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## G01J 1/22

using a variable element in the light-path, e.g. filter, polarising means  
([G01J 1/34](#) takes precedence)

### Definition statement

*This place covers:*

Photometers having means for varying the intensity of a measured or a reference value in order to equalise their effects at the detectors, and wherein said means is a variable element positioned in the light path; e.g. relating to

Visual photometers in which the field of view is split to allow comparison with a standard source and which use grey wedges, adjustable slits or diaphragms, or polarisation filters which swing into the line of sight.

Printed scales for light meters.

Photographic exposure meters, graduated neutral density wedges.

Spinning sectored discs.

Polarisation photometers.

### Relationships with other classification places

In [G01J 4/00](#) (polarization measurement), a modulating polarizer/analyzer is often inserted between the incoming light and the detector during the measurement process. The difference with the present group however is that in [G01J 4/00](#) measurements are simply made in order to determine

Relationships with other classification places

the polarization and are usually not compared to a reference light or electric value, as required in [G01J 1/22](#) (subgroup of [G01J 1/10](#)).

## References

### Limiting references

*This place does not cover:*

Using separate light paths used alternately or sequentially, e.g. flicker	<a href="#">G01J 1/34</a>
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### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Polarizing means inserted in the light path	<a href="#">G01J 1/0429</a>
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## G01J 1/26

adapted for automatic variation of the measured or reference value (regulation of light intensity [G05D 25/00](#))

## References

### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

For optical protection (optical limiters)Indexing Code	<a href="#">G01J 2001/0276</a>
Regulation of light intensity	<a href="#">G05D 25/00</a>

## G01J 1/32

adapted for automatic variation of the measured or reference value (regulation of light intensity [G05D 25/00](#))

## References

### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Regulation of light intensity	<a href="#">G05D 25/00</a>
Feedback loops in optical heads for recording or reproducing	<a href="#">G11B 7/125</a>
For controlling light sources like LEDs	<a href="#">H05B 33/00</a> , <a href="#">H05B 47/00</a>

## G01J 1/34

using separate light paths used alternately or sequentially, e.g. flicker

## Definition statement

*This place covers:*

Comparative photometers in which two different light paths or light types impinge alternately (sequentially) the eye of an observer. Comparison with standard sources are an example.



## Definition statement

Chopper wheels, tuned fork choppers, light dividers, hinged mirrors, nutating mirrors, rotating polygonal mirrors, wheels carrying polarisation filters or colour filters.

Polarisation photometers with flicker effect, with or without a sample, should have a class in [G01J 1/34](#).

Examples of flicker photometer : FR878647, US5936724.

Rotating polygonal mirrors : DE1239870).

Wheels carrying polarisation filters : US2450761.

Wheels carrying colour filters : US2394508.

Visual determination of colour differences by flickering, using colour filters : US2394508.

## References

### Limiting references

*This place does not cover:*

Flickering phenomena due to the behaviour of a sample, e.g. GB2261944	<a href="#">G01N 21/00</a>
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### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Beam switching arrangements	<a href="#">G01J 3/08</a>
Photometers having particular monochromator arrangements	<a href="#">G01J 3/12</a> , <a href="#">G01J 3/14</a>
Polarisation photometers with sample but without flicker effect	<a href="#">G01N 21/21</a>

## G01J 1/36

### using electric radiation detectors

#### Definition statement

*This place covers:*

Comparative photometers in which two different light paths or light types impinge alternately (sequentially) on electric radiation detectors.

## References

### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Beam switching arrangements	<a href="#">G01J 3/08</a>
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## G01J 1/42

using electric radiation detectors (optical or mechanical part [G01J 1/04](#); by comparison with a reference light or electric value [G01J 1/10](#))

### Definition statement

*This place covers:*

All aspects of photometers related to the electric radiation detector(s) itself, e.g. photon counters, particular photodiode types for IR astronomy, position sensitive detectors (PSD), solarimetry, power meters, measurement of light intensity of street lighting, integrating photometers for pulsed sources, sunlight dosimeters.

### References

#### Limiting references

*This place does not cover:*

Optical or mechanical part of electric radiation detectors	<a href="#">G01J 1/04</a>
Using electric radiation detectors by comparison with a reference light or electric value	<a href="#">G01J 1/10</a>

#### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Regulation of detector's gain by automatic gain control	<a href="#">G01J 1/16</a> , <a href="#">G01J 1/1626</a> , <a href="#">G01J 1/18</a> , <a href="#">G01J 1/44</a>
Control systems for motor vehicles (for the headlamps or air-conditioning), with solar radiation as input	<a href="#">B60H 1/0075</a> , <a href="#">B60Q 1/14</a>

## G01J 1/4228

{arrangements with two or more detectors, e.g. for sensitivity compensation}

### Definition statement

*This place covers:*

Photometers, light meters, etc, in which a second detector is used for correction, compensation, etc. Series connected pairs of photodiodes, etc. Photometers using photodetector arrays. Temperature compensation. Background compensation. Linearisation.

### References

#### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Arrangements with two photodetectors, the signals of which are compared	<a href="#">G01J 1/1626</a>
Temperature compensation	<a href="#">G01J 1/18</a>
Pyrometry using multiple wavelengths detection	<a href="#">G01J 5/60</a>

## G01J 1/4257

{applied to monitoring the characteristics of a beam, e.g. laser beam, headlamp beam (monitoring arrangements for lasers in general [H01S 3/0014](#))}

### Definition statement

*This place covers:*

Intensity distribution of laser beams, monitoring the characteristics of laser beams. Laser power measurements. Spot size. Beam waist. Sampling of high energy laser beams.

Characteristics of a beam include power, power repartition or energy density within a cross section of the beam (near-field and far-field energy patterns), size of a cross section of the beam (spot size, beam waist, focus position, waist radius), divergence, quality of a laser beam and position of the beam (by means of electrical detectors (position sensitive detectors, quadrant detectors, etc.)).

### References

#### Limiting references

*This place does not cover:*

Polarization detection of the beam	<a href="#">G01J 4/00</a>
Wavelength, phase, wavefront and coherence detection	<a href="#">G01J 9/00</a>

#### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Cards to be held manually for detecting spot position of an infrared laser beam	<a href="#">G01J 1/58</a>
Shaping the laser beam	<a href="#">B23K 26/06</a> , <a href="#">G02B 27/09</a>
Detection of the power of a laser by calorimetry	<a href="#">G01K 7/00</a>
Monitoring arrangements for lasers in general, e.g. laser power measurement	<a href="#">H01S 3/0014</a>

## G01J 1/429

{applied to measurement of ultraviolet light (using counting tubes [G01T](#))}

### Definition statement

*This place covers:*

All aspects related to the use of electric radiation detectors specific to photometry and applied to measurement of ultraviolet light, e.g. for measuring UV radiation from flames, sun lamps, sterilisation plant, or UV lasers.

Typical examples of subject matter covered by the scope of this subgroup are exposure meters for UV microlithography, UV CCDs for astronomy or weapons tracking, sunburn monitors (using electronic detectors), UV dosimetry, UV fire alarms.

## References

### Informative references

Attention is drawn to the following places, which may be of interest for search:

Radiation therapy	<a href="#">A61N 5/0616</a> , <a href="#">A61N 5/0617</a> and <a href="#">A61N 5/0624</a>
Resistance of materials to light	<a href="#">G01N 17/004</a>
Using counting tubes	<a href="#">G01T</a>
Dose control for microlithography apparatuses	<a href="#">G03F 7/70558</a>

## G01J 1/44

Electric circuits {(for command of an exposure part [G03B 7/02](#))}

### Definition statement

*This place covers:*

All aspects of photometers using electric radiation detectors relating to electrical circuits, e.g. relating to circuits for photodiodes or photoresistors, avalanche photodiode quenching, temperature compensation, signal amplification, noise removal, signal storage, signal transfer, pulse circuits, background removal, autoranging.

### References

#### Limiting references

*This place does not cover:*

Electric circuits for command of an exposure part	<a href="#">G03B 7/02</a>
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### Informative references

Attention is drawn to the following places, which may be of interest for search:

Light pulse detection	<a href="#">G01J 11/00</a>
Avalanche photodiode quenching with fast switching	<a href="#">H03K 17/0416</a> , <a href="#">H03K 17/74</a> , <a href="#">H01L 29/74</a>
Readout of pixel arrays or photodiode arrays	<a href="#">H04N 5/00</a>

## G01J 1/46

using a capacitor

### Definition statement

*This place covers:*

Photometer circuits with capacitor for integration or for generating pulse modulated signal/digital output.

Light meters for pulsed sources, e.g. lasers. Integrating photometers. Digital exposure meters.

Example: Measurement of very low light levels : WO9900649

## G01J 1/50

### using change in colour of an indicator, e.g. actinometer

#### Definition statement

*This place covers:*

Photometric devices using chemical effects, wherein a change in colour of an indicator indicates the amount of received light, e.g. relating to actinometers, sunburn dosimeters,

exposure meters for photography.

#### References

##### *Informative references*

*Attention is drawn to the following places, which may be of interest for search:*

Organic tenebrescent materials	<a href="#">C09K 9/02</a>
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#### Glossary of terms

*In this place, the following terms or expressions are used with the meaning indicated:*

Actinometer	A radiometric instrument used chiefly for meteorological measurements of terrestrial and solar radiation.
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## G01J 1/58

### using luminescence generated by light

#### Definition statement

*This place covers:*

Devices using fluorescence (transfer of UV light to visible light) for measuring the intensity of incoming light (use of visible detectors).

Measuring intensity of UV radiation. Flame detectors. Laser warning devices. Indicator cards for UV radiation.

Suntan gauge.

UV integrating sphere, coated with fluorescent material.

Testing of phosphors.

Actinometry.

Fibre optic UV sensing.

Example: Optical crystal which receives a narrow band visible light from a source and infrared light from a sample (light containing infrared absorption spectrum information of the sample), and transforms these two lights into a sum frequency light having a visible sum frequency image : US6687051. (The visible sum frequency image is then detected.)

## References

### Informative references

Attention is drawn to the following places, which may be of interest for search:

Indicator cards for IR lasers	<a href="#">G01J 1/4257</a>
Fluorescent glasses/filters (special database for compositions)	<a href="#">C03C 3/16</a> , <a href="#">C03C 3/17</a>

## G01J 3/00

### Spectrometry; Spectrophotometry; Monochromators; Measuring colours

#### Definition statement

*This place covers:*

Optical spectrometry, spectrophotometry. Optical spectrometers per se, independently of specific applications, e.g. relating to waveguide spectrometers, acousto-optic spectrometers, imaging spectroscopy, UV spectroscopy, holographic spectroscopy, heterodyne spectroscopy.

Colour measurement per se.

## References

### Application-oriented references

*Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:*

Photometry, spectroscopy, laser technology for microbiology or enzymology	<a href="#">C12M 1/3446</a>
Spectroscopic arrangements for specific types of samples; sample inspection and analysis systems including spectrometers as black box units and/or where the spectrometric apparatus per se is not the core of the invention	<a href="#">G01N 21/00</a>

### Informative references

Attention is drawn to the following places, which may be of interest for search:

Photoacoustic spectroscopy	<a href="#">G01N 21/1702</a>
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## Special rules of classification

Application specific arrangements are classified in [G01N 21/00](#).

In [G01J 3/00](#), the list of Indexing Codes corresponding to finer subdivisions of EC classes and being in use is the following:

[G01J 2003/1213](#)

[G01J 2003/1217](#)

[G01J 2003/1221](#)

[G01J 2003/1226](#)

[G01J 2003/123](#)

[G01J 2003/1239](#)

[G01J 2003/1243](#)

[G01J 2003/1247](#)

[G01J 2003/1278](#)

[G01J 2003/1282](#)

[G01J 2003/1286](#)

[G01J 2003/2866](#)

[G01J 2003/466](#)

[G01J 2003/467](#)

These Indexing Codes therefore belong to the list of codes which must be considered for use during classification. The further remaining Indexing Codes, not appearing in this list above, optionally may be considered as well, but these additional codes, being only optional, cannot be considered as a reliable help for search, because they are not complete.

## **G01J 3/02**

### **Details**

#### **Definition statement**

*This place covers:*

Details relating to particular optical elements of spectrometers, other than general prisms, filters, gratings and photodetectors.

Spectrometers using fibre optics.

Attachments for spectrometers, matching to cameras, correction for stray light.

Parabolic light concentrators. Collimators. Shutters.

Microscopes with beam splitters for spectrometry.

This group has a number of dedicated subgroups corresponding to each type of details. For the rare cases where a specific aspect is not foreseen, the present group is used.

#### **References**

##### **Informative references**

*Attention is drawn to the following places, which may be of interest for search:*

Light concentrators	<a href="#">G02B 19/0004</a>
Shutters per se	<a href="#">G02B 26/04</a>

## G01J 3/04

### Slit arrangements {slit adjustment}

#### Definition statement

*This place covers:*

All aspects relating to slits in spectrometer arrangements, e.g. relating to adjustable slits, mounting arrangements for slits, calibration of slit width, motorised slit mechanisms, reflecting slits, alignment procedures for slits, curved slits.

#### References

##### *Informative references*

*Attention is drawn to the following places, which may be of interest for search:*

Measurement of slit width	<a href="#">G01B</a>
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## G01J 3/06

### Scanning arrangements {arrangements for order-selection}

#### Definition statement

*This place covers:*

All aspects relating to scanning arrangements of elements of a spectrometer, e.g. relating to gratings driven by stepper motor, sinebar mechanisms, continuous rotation of a grating with shaft encoders, cam drive arrangements, fast-scan spectrometers, mechanisms for scanning a mirror or another optical element, screw-based mechanisms for coupling the movement of two optical elements.

## G01J 3/08

### Beam switching arrangements

#### Definition statement

*This place covers:*

Spectrometers having a switching mechanism for switching a light beam between sample path and reference path, for example using segmented mirror wheels or pivoted mirrors. Beam switching arrangements are arrangements for introducing sequentially light beams travelling along different beam paths into a single spectrometer.

## G01J 3/10

### Arrangements of light sources specially adapted for spectrometry or colorimetry

#### Definition statement

*This place covers:*

All aspects relating to light sources or lamps for spectrometers or spectrophotometers, e.g. relating to infrared sources, glow discharge lamps, UV sources, daylight simulators, Cerenkov light source, hollow cathode lamps, pulsed sources, lasers.



## References

### Limiting references

*This place does not cover:*

Calibration of a spectrometer	<a href="#">G01J 3/28</a>
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### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Tunable lasers for frequency modulated spectroscopy	<a href="#">G01J 3/4338</a>
Mixing light signals using waveguides	<a href="#">G02B 6/28</a>
Beam splitting or combining systems (combining different wavelengths)	<a href="#">G02B 27/283</a>
Deuterium lamps as such (details about their constitutive elements)	<a href="#">H01J 61/00</a>
Lasers in general	<a href="#">H01S 3/00</a> , <a href="#">H01S 5/00</a>
Systems using LEDs as light sources	<a href="#">H05B 33/08</a>

## Special rules of classification

This group classifies the documents which contain sufficient details about the light source(s) being used in a spectroscopic device. Sufficient details include for example constructional details, type of light source or the use of a plurality of light sources in order to make a more complete measurement.

It usually does not refer to the position of the light source.

## G01J 3/12

### Generating the spectrum; Monochromators

#### Definition statement

*This place covers:*

Optical devices operating a selection of a relatively narrow spectral band out a broader spectral domain, e.g. relating to monochromators, optical filters associated to a broadband source, optical filters having a variable passband, scanning monochromators, liquid crystal optical filters, graded interference filters, rotating filter wheels or "paddle wheel" filters.

Filters being Fabry-Perot filters or linearly variable filters (wedge shape) ([G01J 3/26](#))

The devices within this group can be placed either before the sample ("source side") or after the sample ("detection side").

## References

### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Fabry-Perot spectrometers	<a href="#">G01J 3/26</a>
Spectrometers using a linearly variable filter	<a href="#">G01J 3/26</a>
Calibration of monochromators	<a href="#">G01J 3/28</a>
Integrated optics miniature spectral devices used in optical multiplexers	<a href="#">G02B 6/12</a>

## Special rules of classification

Specific details about the filters are additionally given appropriate Indexing Codes in the range [G01J 2003/1213](#) - [G01J 2003/1252](#).

## G01J 3/14

using refracting elements, e.g. prisms ([G01J 3/18](#), [G01J 3/26](#) take precedence {prisms per se [G02B 5/04](#)})

### Definition statement

*This place covers:*

Spectrometers using prisms as dispersive element.

### References

#### Limiting references

*This place does not cover:*

Using gratings	<a href="#">G01J 3/18</a>
Using Fabry-Perot cavities or linearly variable filters	<a href="#">G01J 3/26</a>

#### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Prisms per se	<a href="#">G02B 5/04</a>
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## G01J 3/16

with autocollimation

### Definition statement

*This place covers:*

Autocollimating monochromators, i.e. combination of a prism with a concave mirror to produce a parallel beam of dispersed light - has the merit of allowing uniform slit width for all wavelengths.

## G01J 3/18

using diffraction elements, e.g. grating (gratings per se [G02B](#))

### Definition statement

*This place covers:*

All aspects relating to diffraction or dispersion elements in spectrometers, e.g. relating to grating based monochromators or spectrometers, toroidal gratings, plane gratings, concave gratings, double pass grating monochromators, multi-echelle grating monochromators, order sorters.

### References

#### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Gratings per se	<a href="#">G02B 5/00</a>
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In-fibre Bragg gratings	<a href="#">G02B 6/02076</a>
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## G01J 3/26

using multiple reflection, e.g. Fabry-Perot interferometer, variable interference filters

### Definition statement

*This place covers:*

All aspects relating to Fabry-Perot cavities in Fabry-Perot spectrometers and interferometers, and linearly variable filters in spectrometry, e.g. relating to scanning Fabry-Perot interferometers, spectrometers using a wedge shaped linearly variable filter.

### References

#### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Different (simultaneous) incidence angles on an interference filter	<a href="#">G01J 2003/1243</a>
For interferometric Fabry-Perot devices	<a href="#">G01B 9/0209</a>
Fabry-Perot filters per se	<a href="#">G02B 26/001</a>
Cavities containing an active medium (for example heat-sensitive)	<a href="#">G02F 1/21</a> , <a href="#">G02F 1/03</a>

## G01J 3/28

Investigating the spectrum (using colour filters [G01J 3/51](#))

### Definition statement

*This place covers:*

All aspects relating to the various types of calibration or correction of optical spectrometers and spectrophotometers, for example using deconvolution of overlapping spectral lines, derivative spectroscopy, matrix solving methods, spectral library searching, automated calibration, neural networks.

### References

#### Limiting references

*This place does not cover:*

Investigating the spectrum using colour filters	<a href="#">G01J 3/51</a>
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#### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Derivative spectroscopy	<a href="#">G01J 3/433</a>
Pattern recognition and factor analysis	<a href="#">G06T</a>
Demodulation techniques	<a href="#">H03D 3/00</a>

**G01J 3/2803****{using photoelectric array detector}****Definition statement***This place covers:*

All aspects relating to detector arrays in spectrometers, e.g. relating to photodiode array spectrometers, details of CCDs for spectrometry, binning techniques, Vidicon detectors, focal position detection or spectrometer adjustment relatively to a focal point.

**References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Focussing aid for photometers	<a href="#">G02B 7/28</a>
Manufacturing details	<a href="#">H01L 27/14</a>
X-Ray, Gamma ray imaging	<a href="#">H01L 27/14658</a>
Digital cameras per se and associated electronics or readout	<a href="#">H04N</a>

**G01J 3/2823****{Imaging spectrometer}****Definition statement***This place covers:*

An imaging spectrometer collects incident light from a scene and analyzes it to determine the repartition of spectral intensities for each pixel thereof (spatial resolution of the scene).

Either a whole spectrum is measured for each pixel of a scene, or a hyperspectral image (comprising a large number of narrow spectral band spread densely over the spectrum) is produced.

An image is scanned to produce a map showing location of sources of different wavelengths. Applications to satellites.

This group can include imaging interferometers used as spectrometers.

**References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Catoptric systems having multiple imaging planes, including multispectral systems	<a href="#">G02B 17/0694</a>
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**G01J 3/2846****{using modulation grid; Grid spectrometers}****Definition statement***This place covers:*

All aspects relating to measurement techniques based on Hadamard masks or grids, e.g. relating to spectrometers having patterned windows, wherein the patterns are complementary.

**G01J 3/2889****{Rapid scan spectrometers; Time resolved spectrometry}****Definition statement***This place covers:*

All aspects of time-resolved spectroscopy, e.g. relating to time-resolved Fourier transform spectrometry.

**G01J 3/32****Investigating bands of a spectrum in sequence by a single detector****Definition statement***This place covers:*

Spectrometers using a single detector which scans. Successive spectral band detection.

Examples of scanning are a wavelength scanning filter, a detector moving through a spectrum, the use of rotating slotted wheels.

Scanning spectrophotometers.

**G01J 3/36****Investigating two or more bands of a spectrum by separate detectors****Definition statement***This place covers:*

Spectrometers for analysing several spectral bands simultaneously, wherein each band is directed at or detected by a separate detector. Can use diode array detectors. Systems employing several subareas of a large area 2D detector as separate detectors (each subarea detecting a different spectral band) are classified here.

Polychromators (detection side).

Spectral detection in two or more broads spectral ranges, for example UV-Vis-NIR spectrometers. Several different spectrometers in one.

Example of UV-Vis-NIR spectrometers or several different spectrometers in one: DE10010213.

## G01J 3/42

**Absorption spectrometry; Double beam spectrometry; Flicker spectrometry; Reflection spectrometry (beam switching arrangements [G01J 3/08](#))**

### Definition statement

*This place covers:*

All aspects of absorption spectrometry, where the absorption of a sample is being measured, e.g. relating to dual-beam, sample/reference cell spectrometers and spectrophotometers, reflection absorption spectrometers, grazing incidence spectrometers, absorption spectrometers using logarithmic amplifiers or ratio circuits,

cavity ring down spectroscopy (CRDS), nonlinear spectroscopy like two-photon absorption (TPA), THz (Terahertz) spectroscopy)

### References

#### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Arrangements for switching the beam between a reference path and a sample path	<a href="#">G01J 3/08</a>
Sample or cavity related aspects for cavity ring down spectroscopy	<a href="#">G01N 21/00</a>
For cuvette arrangements	<a href="#">G01N 21/03</a> - <a href="#">G01N 21/15</a> , <a href="#">B01J 2219/00274</a>

### Glossary of terms

*In this place, the following terms or expressions are used with the meaning indicated:*

CRDS	Cavity ring down spectroscopy
THz	Terahertz spectroscopy
TPA	two-photon absorption ( e.g. in Nonlinear spectroscopy)

## G01J 3/433

**Modulation spectrometry; Derivative spectrometry**

### Definition statement

*This place covers:*

All aspects of derivative spectroscopy, wavelength, amplitude or phase modulation spectroscopy, phase switching spectroscopy, laser Stark modulation spectroscopy, e.g. relating to spectrometers using wobbling interference filters or a mirror vibrating on a tuning fork.

Derivative spectroscopy is mostly used for :

- Laser stabilization
  - Analysis of gases:
- Measuring low concentrations (or liquids)
- Isolate a constituent among a multiplicity of constituents

- Isolate weak emission lines
- Determine the concentration of a substance in a mixture.

## G01J 3/4338

### {Frequency modulated spectrometry}

#### Definition statement

*This place covers:*

Frequency-modulation absorption spectroscopy, optical heterodyne spectroscopy, e.g. using lead-salt diode lasers, tunable lasers, two-tone techniques, multi-mode lasers, a vibrating slit for wavelength modulation, tilting interference filters, double frequency modulation.

## G01J 3/44

### Raman spectrometry; Scattering spectrometry {; Fluorescence spectrometry}

#### Definition statement

*This place covers:*

All aspects of Raman spectrometry, CARS (= coherent Raman anti-Stokes) spectroscopy, Fourier Transform (FT) Raman spectroscopy, picosecond Raman spectroscopy.

#### Glossary of terms

*In this place, the following terms or expressions are used with the meaning indicated:*

LIBS	Laser induced breakdown spectroscopy
CARS	Coherent Raman Anti-Stokes
SERS	Surface Enhanced Raman Spectroscopy

## G01J 3/4406

### {Fluorescence spectrometry}

#### Definition statement

*This place covers:*

Spectrometers for luminescence, phosphorescence, fluorescence.

Spectrofluorometers, spectrophosphorimeters, microspectrofluorimeters.

## G01J 3/4412

### {Scattering spectrometry (particle sizing by light scattering [G01N 15/0205](#); optical velocimetry of particles [G01P 5/20](#), [G01P 5/26](#))}

#### Definition statement

*This place covers:*

All aspects relating to scattering light spectroscopy, Brillouin scattering spectrometry, dynamic light scattering, quasi-elastic light scattering, photon correlation spectroscopy.

## References

### *Informative references*

Attention is drawn to the following places, which may be of interest for search:

Particle sizing by light scattering	<a href="#">G01N 15/0205</a>
Optical velocimetry of particles	<a href="#">G01P 5/20</a> , <a href="#">G01P 5/26</a>

## G01J 3/443

### Emission spectrometry

#### Definition statement

*This place covers:*

Atomic emission spectrometry.

## References

### *Informative references*

Attention is drawn to the following places, which may be of interest for search:

Spectrometry by spark discharge	<a href="#">G01N 21/67</a>
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## G01J 3/447

### Polarisation spectrometry

#### Definition statement

*This place covers:*

Spectroscopy based on polarisation effects. Fourier Transform polarisation spectroscopy.

Polarisation spectrophotometer for both emission and excitation.

## G01J 3/45

### Interferometric spectrometry

#### Definition statement

*This place covers:*

Spectrum treatment, correction, calibration, standardization of data provided by Fourier Transform (FT) spectrometers or interferometers.

Interfaces to FT spectrometers/interferometers.



## G01J 3/453

### by correlation of the amplitudes

#### Definition statement

*This place covers:*

All aspects of Fourier Transform (FT) infrared, visible or UV spectrometry, e.g. involving Michelson interferometers, polarising interferometers, dual-beam FT spectrometry, static interferometers.

## G01J 3/457

### Correlation spectrometry, e.g. of the intensity ([G01J 3/453](#) takes precedence)

#### Definition statement

*This place covers:*

All aspects of cross-correlation spectrometry, dispersive correlation spectroscopy, e.g. involving mask spectrometers (devices comprising a grating and an array of slits tailored to a predetermined spectrum), cross-correlation interferograms with a Michelson interferometer. Usually, correlation of measured data of interest with measured data serving as reference (e.g. measurement at non-absorbing lines) is performed.)

#### References

##### Limiting references

*This place does not cover:*

Interferometric spectrometry by correlation of the amplitudes	<a href="#">G01J 3/453</a>
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## G01J 3/46

### Measurement of colour; Colour measuring devices, e.g. colorimeters (measuring colour temperature [G01J 5/60](#))

#### Definition statement

*This place covers:*

Optical measurement devices and methods having the purpose of measuring colour, e.g. relating to aspects of chromaticity diagrams, colour-difference formulae, colorimetry based on physiology, checking colour fidelity of TV cameras, CIE standards, tristimulus values, colour matching, control of colour for printing.

#### References

##### Limiting references

*This place does not cover:*

Measuring colour temperature	<a href="#">G01J 5/60</a>
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##### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Blending paints, colour matching	<a href="#">B05D 5/00</a> , <a href="#">B05D 7/00</a> , <a href="#">B01F 15/0408</a>
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Colouring or compounding injection-moulded or blow-moulded plastics parts	<a href="#">B29C 45/18</a> , <a href="#">B29C 48/00</a> , <a href="#">B29B 7/00</a> , <a href="#">B01F 15/00207</a> , <a href="#">B01F 15/0408</a>
Painting, artistic drawings	<a href="#">B44D 3/003</a>
Distributed paint manufacturing system	<a href="#">C09D 7/40</a>
Color recognition for blind people	<a href="#">G01D 7/12</a>
Colour image analysis and flaw detection	<a href="#">G01N 21/00</a> , <a href="#">G06T 7/00</a> , <a href="#">G06T 7/40</a>
Use of histograms in colour spaces, clustering techniques	<a href="#">G06T 7/10</a> , <a href="#">G06T 5/40</a> , <a href="#">G09G 5/02</a> , <a href="#">G09G 5/06</a>
Document validation (e.g. of banknotes, see US3480785)	<a href="#">G07D 7/12</a>
Teaching, or communicating with, the blind, deaf or mute	<a href="#">G09B 21/00</a>
Control of colours for printing, aspects relating to printer specific colour spaces or to the control feedback loop on said printer	<a href="#">H04N 1/60</a>

## G01J 3/461

{with colour spinners}

### Definition statement

*This place covers:*

Colour mixing, colour creation, colour reproduction using colour spinners (discs with partitions, sectors or portions of different colours).

"Visual" mixing, or mixing due to the human eye perception.

## G01J 3/462

{Computing operations in or between colour spaces; Colour management systems}

### Definition statement

*This place covers:*

Matrix representations of colour spaces, transformations from one colour space into another, numerical corrections or manipulations within a colour space.

Colour management systems.

## G01J 3/463

{Colour matching}

### Definition statement

*This place covers:*

Colour matching methods and devices.

## G01J 3/465

**{taking into account the colour perception of the eye; using tristimulus detection}**

### Definition statement

*This place covers:*

Colour measurements taking into account or modelling the particular perception of the human eye. Tristimulus detection, colour measurements based on the CIE colour matching functions.

Metamerism-related issues.

## G01J 3/50

**using electric radiation detectors**

### Definition statement

*This place covers:*

Colour measurement using photocells, cameras etc.

## G01J 3/501

**{Colorimeters using spectrally-selective light sources, e.g. LEDs}**

### Definition statement

*This place covers:*

Colorimeters using a selected number of discrete wavelengths as light source to illuminate the sample.

Examples of selective illuminants are LEDs or a broadband source followed by a filter or filters (the filter(s) being provided between the source and the sample). The resulting light may not be as narrowband as for a LED, but it should be sufficiently narrow for measuring a colour without using filters on the detection side (in front of the detector(s)).

## G01J 3/51

**using colour filters**

### Definition statement

*This place covers:*

Colorimeters having movable filters positioned in front of the detectors (filter wheels).

### References

#### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Visual determination of colour differences by flickering, using filters	<a href="#">G01J 1/34</a>
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## G01J 3/513

{having fixed filter-detector pairs}

### Definition statement

*This place covers:*

Colorimeters having fixed filter-detector pairs.

Colorimeters using dichroic mirrors and ratio detectors (where only two wavelengths are detected and their ratio is monitored)

## G01J 3/52

using colour charts

### Definition statement

*This place covers:*

Colour systems in the form of color charts: OSA, DIN, Coloroid, Ostwald, CIE, BS5252, Munsell. Colour atlases, colour harmony. Farnsworth-Munsell 100-hue test. Grey scales.

Colour charts for printing. Colour charts in digital form (look-up tables).

[G01J 3/52](#) regroups the colour charts as such (the way in which they are built, i. e. the particular presentation of colours that they allow and which answers the needs of a particular application). The way in which a colour database is structured should be classified here and includes "real" charts as well as virtual ones (computer-based)

### References

#### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Methods or devices for colour determination; selection or synthesis e.g. use of colour tables	<a href="#">B44D 3/003</a>
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## G01J 3/522

{circular colour charts}

### Definition statement

*This place covers:*

Circular or partially circular colour charts. Charts made of one or more discs, superposed or not.

### References

#### Limiting references

*This place does not cover:*

Polygonal (pentagonal...) charts , i.e. not considered circular	<a href="#">G01J 3/52</a>
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## G01J 3/524

{Calibration of colorimeters}

### Definition statement

*This place covers:*

All aspects relating to the calibration of colorimeters.

### References

#### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Colour charts per se	<a href="#">G01J 3/52</a> , <a href="#">G01J 3/522</a>
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## G01J 3/526

{for choosing a combination of different colours, e.g. to produce a pleasing effect for an observer}

### Definition statement

*This place covers:*

Devices which help a user to determine a choice of (different) colours which harmonize together, in the sense that the global effect of these colours put next to each other is pleasing to the eye. Mostly used for showing colour combinations in the fields of interior decoration (colours of sofas, walls, ceilings, curtains...), for the choice of different colours to be applied on different parts of a car, or in the field of clothing.

All aspects relating to the choice of pleasant colour combinations, e.g. relating to choice of colours for interior decoration, choice of colours in a nail varnish simulator, charts, advertising displays, etc, for aiding choice of colour, combination of colours.

### References

#### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Colour of hair and choice of the right dye	<a href="#">A45D 44/005</a>
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## G01J 3/528

{using colour harmony theory}

### Definition statement

*This place covers:*

Devices using colour harmony theory. These devices rely on the definition of colour harmony, according to which n colours harmonize together when their mixture gives a grey colour. These devices are usually circular colour charts covered by a mask with a number of holes. Choosing a first colour by means of one of the holes leads to the selection of other ("harmonic") colours through the remaining holes.

## G01J 4/00

### Measuring polarisation of light (investigating or analysing materials by measuring rotation of plane of polarised light [G01N 21/21](#))

#### Definition statement

*This place covers:*

Passive measurement of the polarisation state of a beam of incoming light. Measurement of degree of depolarisation.

#### Relationships with other classification places

This group does not cover ellipsometric devices (classified in [G01N 21/211](#)), which send a selectable polarized light on a sample (active device) and detect afterwards the effect of the sample on the polarization state of the input light. Documents about ellipsometry may have a class in [G01J](#) only if they present special or unusual ways of detecting polarization on the detection side (passive detection).

#### References

##### Application-oriented references

*Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:*

Investigating or analysing materials by measuring rotation of plane of polarised light	<a href="#">G01N 21/21</a>
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##### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Measurement of the polarisation dispersion of a transparent body (fiber) and/or testing of the optical properties of optical elements (lenses, fibers,...)	<a href="#">G01M 11/00</a>
Optical elements for polarizing light	<a href="#">G02B 27/28</a>
Optical elements for polarization control	<a href="#">G02B 27/286</a>

## G01J 4/02

### Polarimeters of separated-field type; Polarimeters of half-shadow type

#### Definition statement

*This place covers:*

Polarimeters having a spatial filter for separating an incoming light beams into sub-beams.

## G01J 4/04

### Polarimeters using electric detection means ([G01J 4/02](#) takes precedence)

#### Definition statement

*This place covers:*

Aspects of polarimeters relating in particular to electric radiation detectors and processing of the detected signals. Stokes, Jones, Mueller representations of polarization states and related calculus.

Example for Mueller representations of polarization states and related calculus : US2003117624.

## References

### Limiting references

*This place does not cover:*

Polarimeters of separated-field type; Polarimeters of half-shadow type	<a href="#">G01J 4/02</a>
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## G01J 5/00

### Radiation pyrometry

#### Definition statement

*This place covers:*

Optical and IR pyrometry. Thermal imaging for temperature determination.

Non-contact temperature measurement using optical means (infrared, visible or ultraviolet radiation).

Temperature measurement by light scattering, fluorescence, laser beam deflection.

Pyromagnetic effect: magnetic infrared sensor.

## References

### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Photometry in general	<a href="#">G01J 1/00</a>
Spectrometry in general	<a href="#">G01J 3/00</a>
Image processing procedures for thermal measurement	<a href="#">G01J 5/025</a>
Interfacing a pyrometer to an external device or network; User interface	<a href="#">G01J 5/025</a>
Testing and calibration	<a href="#">G01J 5/52</a> , <a href="#">G01J 2005/0048</a>
Measuring temperature in general, i.e. with a contacting sensor	<a href="#">G01K</a>
Temperature measurement using microwaves	<a href="#">G01K 11/006</a>
Calorimetry of radiation beams	<a href="#">G01K 17/00</a>
Direction finders for radiant sources	<a href="#">G01S</a>
Intrusion detection by radiation	<a href="#">G08B</a>

### Special rules of classification

For the most frequent applications, please see application related subgroups of [G01J 5/00](#). These application groups should be allocated systematically to all documents relating to an application covered by these groups.

The group [G01J 5/16](#) does not contain only thermopiles : other detectors having temperature compensation circuits for which no other group is foreseen are classified here too (e.g. US2004079888).

In [G01J 5/00](#), the list of Indexing Codes corresponding to finer subdivisions of EC classes being used is the following:

[G01J 2005/0048](#)

[G01J 2005/0051](#)

[G01J 2005/0074](#)

[G01J 2005/0077](#)

[G01J 2005/0081](#)

[G01J 2005/068](#)

[G01J 2005/583](#)

These Indexing Codes therefore belong to the list of codes which must be considered for use during classification. The further remaining Indexing Codes, not appearing in this list above, optionally may be considered as well, but these additional codes, being only optional, cannot be considered as a reliable help for search, because they are not complete.

Whilst [G01J 5/0834](#) indicates the use of a shutter or chopper, the group [G01J 5/62](#) is dedicated to design details of the shutter/chopper.

## G01J 5/0003

{for sensing the radiant heat transfer of samples, e.g. emittance meter}

### Definition statement

*This place covers:*

Measurement of radiant heat transfer of samples.

### References

#### Informative references

Attention is drawn to the following places, which may be of interest for search:

Wafer temperature determination	<a href="#">G01J 5/0007</a>
Emissivity via reflectivity	<a href="#">G01J 5/0007</a> , <a href="#">G01J 2005/0048</a> , <a href="#">G01J 2005/0074</a>
Temperature control	<a href="#">G05D 23/27</a>

## G01J 5/0014

{for sensing the radiation from gases, flames}

### Definition statement

*This place covers:*

Optical pyrometry for flames and/or gases and/or smoke, e.g. involving temperature measurement of hydrogen flames, arcs, plasmas, temperature measurement by light scattering, fluorescence, laser beam deflection, plasma temperature profile in MHD boundary layer, remote sensing of gases temperature in the atmosphere, the use of line-reversal methods.



## References

### Informative references

Attention is drawn to the following places, which may be of interest for search:

Monitoring flames	<a href="#">F23N 5/08</a>
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## G01J 5/0022

{for sensing the radiation of moving bodies}

### Definition statement

*This place covers:*

Non-contact temperature measurement of moving objects, e.g. steel strip, turbine blades, yarn, float glass, motor rotors, railway wagon wheel bearings. Detection of vehicle wheel spin by pyrometry.

## References

### Informative references

Attention is drawn to the following places, which may be of interest for search:

Temperature detection of rotating bodies	<a href="#">G01K 13/08</a>
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## G01J 5/02

### Details

### Definition statement

*This place covers:*

Details about non optical aspects of non-contact temperature detection devices.

Details about optical aspects of non-contact temperature detection devices : [G01J 5/08](#)

Elimination of stray light : [G01J 5/06](#)

Getters : [G01J 5/045](#), (explanatory example FR2825290)

Ear thermometer probe covers : [G01J 5/021](#)

Ear thermometers casings : [G01J 5/049](#)

Focal plane arrays with on-focal plane or "up front" processing : US2004075057

Dual-mode (passive and active) focal plane array : US2004004707

Monitoring correct functioning for outputting temperature : US2002146057

Screening combinatorial libraries : US6576906

## References

### Informative references

Attention is drawn to the following places, which may be of interest for search:

Getters per se	<a href="#">B01D 53/0407</a> , <a href="#">H01L 23/26</a>
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## Special rules of classification

The general group: [G01J 5/0011](#) for ear thermometers applies when neither [G01J 5/049](#) nor [G01J 5/021](#) is relevant.

## G01J 5/04

### Casings {Mountings}

#### Definition statement

*This place covers:*

Details of housings of IR detectors. Purging arrangements, choice of thermal materials, encapsulated packages. Mounting arrangements for a pyrometer. Infrared thermometers, particularly mounts. Mounts for astronomical radiometers.

## References

### Limiting references

*This place does not cover:*

Window details, e.g. window seals	<a href="#">G01J 5/0875</a>
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### Informative references

Attention is drawn to the following places, which may be of interest for search:

Details of a grip for a handheld sensor	<a href="#">G01J 5/0265</a>
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## G01J 5/041

### {Mountings in enclosures or in a particular environment}

#### Definition statement

*This place covers:*

All aspects of mountings or housings of pyrometers in environments where the available space is very limited and/or where difficult measurement conditions prevail, for example due to dust or strong vibrations. Examples of such environments include car engines, exhaust pipes, furnaces, rotating machines, kilns, electron microscopes, moulds, gas turbines, microwave ovens, brakes.

## References

### Informative references

Attention is drawn to the following places, which may be of interest for search:

Fibre optics, sapphire-tipped probes for hostile environments, immersion probes for melts	<a href="#">G01J 5/0818</a> , <a href="#">G01J 5/0037</a> , <a href="#">G01J 5/004</a>
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Contact thermometers	<a href="#">G01K 1/00</a>
Rotating machines	<a href="#">G01K 13/08</a>

## G01J 5/06

### Arrangements for eliminating effects of disturbing radiation

#### Definition statement

*This place covers:*

Cold shields, field stops at reference temperature. Radiation shields for thermocouples.

Constructional arrangements having the effect of limiting, reducing or eliminating spurious radiation.

## G01J 5/061

{using cooling or thermostating of parts of the apparatus (cooling techniques in general [F17C](#), [F25J](#))}

#### Definition statement

*This place covers:*

All aspects of non contact temperature measurement devices relating to the use of cooling or thermostating mechanisms for parts of the device, e.g. involving cryostats or vacuum vessels for IR detectors, cold shields, integrated detectors/coolers, self-cooling detectors, thermoelectric cooling, cold fingers, Dewar vessels.

#### References

##### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Cooling techniques in general	<a href="#">F17C</a> , <a href="#">F25J</a>
Cooling devices per se	<a href="#">F25B 9/00</a> , <a href="#">F25B 19/00</a> , <a href="#">F25B 21/00</a>

## G01J 5/08

Optical features {(optical-mechanical scanning [H04N 5/33](#), [G02B 26/10](#))}

#### Definition statement

*This place covers:*

Details about optical aspects of non-contact temperature detection devices.

Optical fibre thermometry. Infrared light guides. Sighting or pointing arrangements for pyrometers.

Infrared detectors having individual concentrators and conical horn antennas : US2003089842, GB2369724

## References

### Informative references

Attention is drawn to the following places, which may be of interest for search:

Simultaneous imaging of IR and millimetre waves	<a href="#">G01J 5/025</a>
Probe for molten metal	<a href="#">B22D 2/00</a>
Sighting or pointing arrangements	<a href="#">F41G</a>
Detecting a number of persons in a room by scanning	<a href="#">G07C 9/00</a>
Optical-mechanical scanning	<a href="#">H04N 5/33</a> , <a href="#">G02B 26/10</a>

## G01J 5/10

### using electric radiation detectors

#### Definition statement

*This place covers:*

Detector aspects which do not depend on the specific features of thermopiles (classified in [G01J 5/12](#)), bolometers ([G01J 5/20](#)) or pyroelectric devices ([G01J 5/34](#)), that is, which can be used with any of these detector types.

#### Special rules of classification

In case generic disclosures are illustrated by means of one of these particular devices (i.e. bolometer) then both a class in [G01J 5/10](#) and in [G01J 5/20](#) (bolometers) should be given.

## G01J 5/12

### using thermoelectric elements, e.g. thermocouples (thermoelectric elements per se [H01L 35/00](#), [H01L 37/00](#))

#### Definition statement

*This place covers:*

All aspects of thermopile detectors (arrays of thermocouples), e.g. relating to specific geometrical arrangements of the thermocouples, cold junction temperature compensation, thermocouples consisting of tensioned wire grid, heat flux meters.

## References

### Informative references

Attention is drawn to the following places, which may be of interest for search:

Thermoelectric elements per se	<a href="#">H01L 35/00</a> , <a href="#">H01L 37/00</a>
Multilayer devices	<a href="#">H01L 35/32</a> , <a href="#">H01L 35/20</a> , <a href="#">H01L 35/26</a>

## G01J 5/14

### Electrical features

#### Definition statement

*This place covers:*

All aspects of thermopile detectors relating to electrical circuits and/or signal processing, e.g. involving linearisation of the detector's output, negative feedback to improve frequency response.

## G01J 5/16

### Arrangements with respect to the cold junction; Compensating influence of ambient temperature or other variables

#### Definition statement

*This place covers:*

Thermopiles in which the cold junction temperature is measured (for correction purposes), or in which the cold junction is thermostated.

Other detectors having temperature compensation circuits for which no other group is foreseen are classified here too (e.g. US2004079888)

## G01J 5/20

### using resistors, thermistors or semiconductors sensitive to radiation

#### Definition statement

*This place covers:*

All aspects of bolometric or junction based detectors, e.g. relating to fabrication details, superconducting bolometers, bolometer arrays, diode-based bolometers, cavity radiometers.

#### References

##### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Particular leg structure/construction/shape	<a href="#">G01J 5/023</a>
Particular layer structure/construction/shape	<a href="#">G01J 5/024</a>
Fabrication of thin-film resistors	<a href="#">H01C 17/075</a>
Fabrication techniques	<a href="#">H01L 27/16</a>
Millimeter-wave detection and imaging	<a href="#">H01Q 1/22</a> , <a href="#">H01Q 1/38</a> , <a href="#">H01L 27/00</a> , <a href="#">G01K 11/006</a>
Thermal imaging	<a href="#">H04N 5/33</a>

## G01J 5/22

### Electrical features

#### Definition statement

*This place covers:*

All aspects of bolometric or junction based detectors relating to electrical circuits and/or signal processing, e.g. involving correction of bolometer drift, superconducting bolometers, bolometer bridge circuits and their compensation, pulsed bolometers, a.c. bolometers.

## G01J 5/34

### using capacitors {, e.g. pyroelectric elements}

#### Definition statement

*This place covers:*

Infrared sensors based on pyroelectric effect. Details for fabrication of pyroelectric arrays, etc. Infrared CCD imaging for intruder alarms, fire alarms. Pyroelectric polymer films, LiTaO<sub>3</sub>, Sr(1-x)Ba<sub>x</sub>Nb<sub>2</sub>O<sub>6</sub>, other ferroelectric materials.

#### References

##### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Pyroelectric devices other than temperature detectors	<a href="#">H01L 37/02</a>
Thermal imaging	<a href="#">H04N 5/33</a>

## G01J 5/40

### using bimetallic elements

#### Definition statement

*This place covers:*

Using bimetallic elements.

More generally, detectors having stacked layers of materials having different thermal expansion coefficients, the materials not being necessarily metallic.

## G01J 5/44

### using change of resonant frequency, e.g. of piezo-electric crystal

#### References

##### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Piezoelectric vibrating elements	<a href="#">B06B 1/06</a> , <a href="#">H01L 41/09</a>
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## G01J 5/52

### using comparison with reference sources, e.g. disappearing-filament pyrometer

#### Definition statement

*This place covers:*

Optical or IR pyrometry using comparison with standard, e.g. using mirrored choppers. In-line black body reference.

Disappearing-filament pyrometers.

## G01J 5/522

### {Reference sources, e.g. standard lamps; Black bodies}

#### Definition statement

*This place covers:*

Calibration and testing of infrared imagers for temperature detection.

Reference black bodies. Reference sources per se and devices to expose detectors to be calibrated to said sources. Thermal scene projectors for testing IR imagers.

Synthesis of infrared spectral signatures.

Theory of blackbody cavities. Absolute radiometry.

Standard IR lamps. Imager with inbuilt reference source.

Array of emitters (e.g. WO0025086).

#### References

##### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Testing of the correct functioning of a motion detector (e.g. US5504473)	<a href="#">G08B 29/00</a>
Non-uniformity compensation for infrared detector arrays	<a href="#">H04N 5/2173</a> , <a href="#">H04N 5/33</a>

## G01J 5/58

### using absorption; using polarisation; using extinction effect

#### Definition statement

*This place covers:*

Temperature measurement and thermal imaging using polarisation of the radiation. Polaradiometer. Polariser used with disappearing filament pyrometer.

Devices using absorption of a single incident wavelength or band, without spectral dispersion.

**G01J 5/60**

**using determination of colour temperature {Pyrometry using two wavelengths filtering; using selective, monochromatic or bandpass filtering; using spectral scanning}**

**Definition statement**

*This place covers:*

Pyrometers or non-contact temperature measuring devices making use of multiple wavelengths in the optical domain (infrared, visible or ultraviolet). Can be spectral band detection, discrete wavelengths detection or full spectral characterisation. Fluorescence detection.

Determination of colour temperature. Greybody assumption.

**G01J 5/601**

**{using spectral scanning}**

**Definition statement**

*This place covers:*

Multiple-wavelength pyrometers for observing spectrum, using prisms, gratings, etc.

Spectralradiometers. Raman scattering. A finely resolved spectrum is detected either sequentially (spectral scanning) or simultaneously (snapshot detection).

**G01J 5/602**

**{using selective, monochromatic or bandpass filtering}**

**Definition statement**

*This place covers:*

All aspects of non contact temperature measurement or colour temperature measurement which is based on the detection of specific spectral bands, e.g. involving monochromatic pyrometry, or the use of band pass or narrow band filters.

**G01J 5/62**

**using means for chopping the light {Compensation for background radiation of chopper element}**

**Definition statement**

*This place covers:*

Details about the construction of the chopper itself, e.g. relating to the chopper wheels, IR detector packages with integral shuttered windows, liquid crystal shutters, electro-optical elements for modulating IR beam, circuit arrangements (peak detection, sample and hold circuits) linked to the chopper.



## References

### Informative references

Attention is drawn to the following places, which may be of interest for search:

Shutters to protect photodetectors	<a href="#">G01J 2001/0276</a> , <a href="#">G01J 1/26</a>
Optical devices or arrangements using movable or deformable optical elements for controlling the intensity, colour, phase, polarisation or direction of light by periodically varying the intensity of light, e.g. using choppers	<a href="#">G02B 26/04</a>
Mounting of optical parts, e.g. lenses, shutters, filters; optical parts peculiar to the presence of use of an electronic image sensor	<a href="#">H04N 5/2254</a>
Transforming infra-red radiation	<a href="#">H04N 5/33</a>

### Special rules of classification

Whilst [G01J 5/0834](#) already indicates the use of a shutter/chopper, the present group is dedicated to design details of the shutter/chopper.

## G01J 7/00

### Measuring velocity of light

#### Definition statement

*This place covers:*

Devices to perform extremely accurate measurements of the velocity of light.

The usual purpose of these devices is to check the validity of Einstein's theory of relativity.

## G01J 9/00

**Measuring optical phase difference (devices or arrangements for controlling the phase of light beams [G02F 1/01](#)); Determining degree of coherence; Measuring optical wavelength (spectrometry [G01J 3/00](#))**

#### Definition statement

*This place covers:*

Non-interferometric measurement devices and methods for measuring wavefront, phase, coherence length and/or wavelength of an incoming light beam, e.g. relating to wavefront sensors, Shack Hartmann detectors, laser diagnostics for wavelength, phase and coherence measurement, wavefront detection per se for restoration of images degraded by turbulence, wavelength stabilization of laser beams by means of non interferometric determination of wavelength.

## References

### Limiting references

*This place does not cover:*

Spectrometry	<a href="#">G01J 3/00</a>
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**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Laser diagnostics where parameters other than wavelength and polarisation are determined	<a href="#">G01J 1/4257</a>
Wavelength stabilization of laser beams by means of interferometric determination of wavelength	<a href="#">G01J 9/0246</a> , <a href="#">H01S 3/106</a> , <a href="#">H01S 3/213</a> , <a href="#">H01S 5/0687</a> , <a href="#">H01S 5/1212</a>
Wavefront sensing and adaptive optics for restoring images degraded by turbulence	<a href="#">G02B 26/06</a>
Devices or arrangements for controlling the phase of light beams	<a href="#">G02F 1/01</a>
Wavelength stabilization of laser beams where the wavelength is not numerically derived or actually calculated	<a href="#">H01S 3/00</a> , <a href="#">H01S 5/00</a>
Optical wavelength measurement for wavelength division multiplexing and telecom applications	<a href="#">H04J 14/00</a>

**Special rules of classification**

In [G01J 9/00](#), the list of Indexing Codes corresponding to finer subdivisions of EC classes being used is the following:

[G01J 2009/0219](#)

[G01J 2009/0223](#)

[G01J 2009/0226](#)

[G01J 2009/023](#)

[G01J 2009/0234](#)

[G01J 2009/0238](#)

[G01J 2009/0242](#)

[G01J 2009/0261](#)

[G01J 2009/0265](#)

[G01J 2009/0273](#)

These Indexing Codes therefore belong to the list of codes which must be considered for use during classification. The further remaining Indexing Codes, not appearing in this list above, optionally may be considered as well, but these additional codes, being only optional, cannot be considered as a reliable help for search, because they are not complete.

## G01J 9/02

by interferometric methods (using interferometers for measuring optically the linear dimensions of objects [G01B 9/02](#))

### Definition statement

*This place covers:*

Interferometric devices for measuring wavefront, phase, coherence and/or wavelength of an incoming light beam. Mach-Zehnder, Talbot, Fizeau configurations etc, also with optical fibres.

Wavefront control with optical feedback. Phase-conjugate interferometers.

Wavemeters. Lau effect.

### References

#### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Interferometric tomography	<a href="#">G01B</a>
Using interferometers for measuring optically the linear dimensions of objects	<a href="#">G01B 9/02</a>
Optical fiber interferometer	<a href="#">G01B 9/02041</a>
Measurement of the Optical Transfer Function (OTF) of a unit under test, measurement of the wavelength dispersion due to a transparent body (fiber)	<a href="#">G01M 11/00</a>

## G01J 9/0215

{by shearing interferometric methods}

### Definition statement

*This place covers:*

Differential interferometry (= shearing interferometry) for measuring phase difference per se or degree of coherence of incoming light. Talbot interferometry.

Holographic interferometry. Moire interferometry. Speckle pattern interferometry

### References

#### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Optical tomography	<a href="#">G01B</a>
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**G01J 9/0246****{Measuring optical wavelength}****Definition statement***This place covers:*

Interferometers for measuring wavelength, phase, etc, of laser beams. Single Wavelength Detection (SWD). Vernier fringe counting.

Spectral characteristics of laser beams.

**G01J 9/04****by beating two waves of a same source but of different frequency and measuring the phase shift of the lower frequency obtained****Definition statement***This place covers:*

Heterodyne laser interferometry. Self-homodyne technique. Optical heterodyne detection. Fibre-optic interferometry + spectrometry.

Use of a beat frequency between a known (local oscillator) signal and an unknown signal in order to measure the wavelength of the unknown signal.

**G01J 11/00****Measuring the characteristics of individual optical pulses or of optical pulse trains****Definition statement***This place covers:*

Measurements on laser pulses, e.g.

- Optical pulse train correlation.
- Interferometric autocorrelation.
- Solitons in optical fibres. Chirp measurement.
- Diffraction grating autocorrelators.
- Frequency-resolved optical gating [FROG].
- Autocorrelator for ultrashort optical pulses.

**References****Informative references**

Attention is drawn to the following places, which may be of interest for search:

Time interval measurements by means of optical pulses	<a href="#">G04F 13/026</a>
Pulse compression or frequency chirping of laser pulses	<a href="#">H01S 3/0057</a>