

## SECTION H — ELECTRICITY

### H01 BASIC ELECTRIC ELEMENTS

#### H01S DEVICES USING STIMULATED EMISSION

##### Note(s)

This subclass covers:

- devices for the generation or amplification, by using stimulated emission, of coherent electromagnetic waves or other forms of wave energy;
- such functions as modulating, demodulating, controlling, or stabilising such waves.

##### Subclass index

MASERS.....	1/00
SEMICONDUCTOR LASERS.....	5/00
LASERS OTHER THAN SEMICONDUCTOR LASERS.....	3/00
OTHER DEVICES USING STIMULATED EMISSION.....	4/00

<b>1/00</b>	<b>Masers, i.e. devices for generation, amplification, modulation, demodulation, or frequency-changing, using stimulated emission, of electromagnetic waves of wavelength longer than that of infra-red waves</b>	3/08	• • Construction or shape of optical resonators or components thereof [2]
1/02	• solid	3/081	• • • comprising more than two reflectors [2]
1/04	• liquid	3/082	• • • • defining a plurality of resonators, e.g. for mode selection [2]
1/06	• gaseous	3/083	• • • • Ring lasers [2]
<b>3/00</b>	<b>Lasers, i.e. devices for generation, amplification, modulation, demodulation, or frequency-changing, using stimulated emission, of infra-red, visible, or ultra-violet waves (semiconductor lasers H01S 5/00)</b>	3/086	• • • One or more reflectors having variable properties or positions for initial adjustment of the resonator (varying a parameter of the laser output during operation H01S 3/10; stabilisation of the laser output H01S 3/13) [2]
3/02	• Constructional details	3/09	• Processes or apparatus for excitation, e.g. pumping
3/03	• • of gas laser discharge tubes [2]	3/091	• • • using optical pumping [2]
3/032	• • • for confinement of the discharge, e.g. by special features of the discharge constricting tube [5]	3/0915	• • • • by incoherent light [5]
3/034	• • • Optical devices within, or forming part of, the tube, e.g. windows, mirrors (reflectors having variable properties or positions for initial adjustment of the resonator H01S 3/086) [5]	3/092	• • • • of flash lamp (H01S 3/0937 takes precedence) [2, 5]
3/036	• • • Means for obtaining or maintaining the desired gas pressure within the tube, e.g. by gettering or replenishing; Means for circulating the gas, e.g. for equalising the pressure within the tube [5]	3/093	• • • • • focusing or directing the excitation energy into the active medium [2, 5]
3/038	• • • Electrodes, e.g. special shape, configuration or composition [5]	3/0933	• • • • of a semiconductor, e.g. light emitting diode [5]
3/04	• • Cooling arrangements	3/0937	• • • • produced by exploding or combustible material [5]
3/041	• • • for gas lasers [5]	3/094	• • • • by coherent light [2]
3/042	• • • for solid state lasers [5]	3/0941	• • • • of a semiconductor laser, e.g. of a laser diode [6]
3/05	• Construction or shape of optical resonators; Accommodation of active medium therein; Shape of active medium	3/0943	• • • • of a gas laser [5]
3/06	• • Construction or shape of active medium	3/0947	• • • • of an organic dye laser [5]
3/063	• • • Waveguide lasers, e.g. laser amplifiers [7]	3/095	• • • using chemical or thermal pumping [2]
3/067	• • • • Fibre lasers [7]	3/0951	• • • • by increasing the pressure in the laser gas medium [5]
3/07	• • • consisting of a plurality of parts, e.g. segments (H01S 3/067 takes precedence) [2, 7]	3/0953	• • • • Gas dynamic lasers, i.e. with expansion of the laser gas medium to supersonic flow speeds [5]
		3/0955	• • • using pumping by high energy particles [5]
		3/0957	• • • by high energy nuclear particles [5]
		3/0959	• • • by an electron beam [5]
		3/097	• • • by gas discharge of a gas laser [2]

- 3/0971 • • • transversely excited (H01S 3/0975 takes precedence) [5]
- 3/0973 • • • • having a travelling wave passing through the active medium [5]
- 3/0975 • • • using inductive or capacitive excitation [5]
- 3/0977 • • • having auxiliary ionisation means [5]
- 3/0979 • • • Gas dynamic lasers, i.e. with expansion of the laser gas medium to supersonic flow speeds [5]
- 3/098 • Mode locking; Mode suppression (mode suppression using a plurality of resonators H01S 3/082) [2]
- 3/10 • Controlling the intensity, frequency, phase, polarisation or direction of the emitted radiation, e.g. switching, gating, modulating or demodulating (mode locking H01S 3/098) [2]
- 3/101 • • Lasers provided with means to change the location from which, or the direction in which, laser radiation is emitted [2]
- 3/102 • • by controlling the active medium, e.g. by controlling the processes or apparatus for excitation (H01S 3/13 takes precedence) [4]
- 3/104 • • • in gas lasers [4]
- 3/105 • • by controlling the mutual position or the reflecting properties of the reflectors of the cavity (H01S 3/13 takes precedence) [4]
- 3/1055 • • • one of the reflectors being constituted by a diffraction grating [4]
- 3/106 • • by controlling a device placed within the cavity (H01S 3/13 takes precedence) [4]
- 3/107 • • • using an electro-optical device, e.g. exhibiting Pockels- or Kerr-effect [4]
- 3/108 • • • using a non-linear optical device, e.g. exhibiting Brillouin- or Raman-scattering [4]
- 3/109 • • • • Frequency multiplying, e.g. harmonic generation [4]
- 3/11 • • in which the quality factor of the optical resonator is rapidly changed, i.e. giant-pulse technique
- 3/113 • • • using bleachable or solarising media [2]
- 3/115 • • • using an electro-optical device [4]
- 3/117 • • • using an acousto-optical device [4]
- 3/121 • • • using a mechanical device [4]
- 3/123 • • • • Rotating mirror [4]
- 3/125 • • • • Rotating prism [4]
- 3/127 • • • Plural Q-switches [4]
- 3/13 • • Stabilisation of laser output parameters, e.g. frequency, amplitude [2]
- 3/131 • • • by controlling the active medium, e.g. by controlling the processes or apparatus for excitation [4]
- 3/134 • • • • in gas lasers [4]
- 3/136 • • • by controlling a device placed within the cavity [4]
- 3/137 • • • • for stabilising of frequency [4]
- 3/139 • • • by controlling the mutual position or the reflecting properties of the reflectors of the cavity [4]
- 3/14 • characterised by the material used as the active medium
- 3/16 • • Solid materials
- 3/17 • • • amorphous, e.g. glass [2]
- 3/20 • • Liquids
- 3/207 • • • including a chelate [5]
- 3/213 • • • including an organic dye [5]
- 3/22 • • Gases
- 3/223 • • • the active gas being polyatomic, i.e. containing more than one atom (H01S 3/227 takes precedence) [2, 5]
- 3/225 • • • • comprising an excimer or exciplex [5]
- 3/227 • • • Metal vapour [5]
- 3/23 • • Arrangement of two or more lasers not provided for in groups H01S 3/02-H01S 3/14, e.g. tandem arrangement of separate active media (involving only semiconductor lasers H01S 5/40) [2, 7]
- 3/30 • • using scattering effects, e.g. stimulated Brillouin or Raman effects [2]
- 4/00 Devices using stimulated emission of wave energy other than those covered by groups H01S 1/00, H01S 3/00 or H01S 5/00, e.g. phonon maser, gamma maser**
- 5/00 Semiconductor lasers [7]**
- Note(s) [2010.01]**
- Attention is drawn to Note (3) after the title of section C, which Note indicates to which version of the periodic table of chemical elements the IPC refers. In this group, the Periodic System used is the 8 group system indicated by Roman numerals in the Periodic Table thereunder.
- 5/02 • • Structural details or components not essential to laser action [7]
- 5/022 • • Mountings; Housings [7]
- 5/024 • • Cooling arrangements [7]
- 5/026 • • Monolithically integrated components, e.g. waveguides, monitoring photo-detectors or drivers (stabilisation of output H01S 5/06) [7]
- 5/028 • • Coatings [7]
- 5/04 • • Processes or apparatus for excitation, e.g. pumping (H01S 5/06 takes precedence) [7]
- 5/042 • • Electrical excitation [7]
- 5/06 • • Arrangements for controlling the laser output parameters, e.g. by operating on the active medium [7]
- 5/062 • • • by varying the potential of the electrodes (H01S 5/065 takes precedence) [7]
- 5/0625 • • • in multi-section lasers [7]
- 5/065 • • Mode locking; Mode suppression; Mode selection [7]
- 5/068 • • Stabilisation of laser output parameters (H01S 5/0625 takes precedence) [7]
- 5/0683 • • • by monitoring the optical output parameters [7]
- 5/0687 • • • • Stabilising the frequency of the laser [7]
- 5/10 • • Construction or shape of the optical resonator [7]
- 5/12 • • the resonator having a periodic structure, e.g. in distributed feed-back lasers (DFB-lasers) (H01S 5/18 takes precedence) [7]
- 5/125 • • • Distributed Bragg reflector lasers (DBR-lasers) [7]
- 5/14 • • External cavity lasers (H01S 5/18 takes precedence; mode locking H01S 5/065) [7]
- 5/16 • • Window-type lasers, i.e. with a region of non-absorbing material between the active region and the reflecting surface (H01S 5/14 takes precedence) [7]
- 5/18 • • Surface-emitting lasers (SE-lasers) [7]
- 5/183 • • • having a vertical cavity (VCSE-lasers) [7]
- 5/187 • • • using a distributed Bragg reflector (SE-DBR-lasers) (H01S 5/183 takes precedence) [7]
- 5/20 • • Structure or shape of the semiconductor body to guide the optical wave [7]
- 5/22 • • having a ridge or a stripe structure [7]
- 5/223 • • • Buried stripe structure (H01S 5/227 takes precedence) [7]

- 5/227 • • • Buried mesa structure [7]
- 5/24 • • having a grooved structure, e.g. V-grooved [7]
- 5/30 • Structure or shape of the active region; Materials used for the active region [7]
- 5/32 • • comprising PN junctions, e.g. hetero- or double-hetero-structures (H01S 5/34, H01S 5/36 take precedence) [7]
- 5/323 • • • in  $A_{III}B_V$  compounds, e.g. AlGaAs-laser [7]
- 5/327 • • • in  $A_{II}B_{VI}$  compounds, e.g. ZnCdSe-laser [7]
- 5/34 • • comprising quantum well or superlattice structures, e.g. single quantum well lasers (SQW-lasers), multiple quantum well lasers (MQW-lasers), graded index separate confinement heterostructure lasers (GRINSCH-lasers) (H01S 5/36 takes precedence) [7]
- 5/343 • • • in  $A_{III}B_V$  compounds, e.g. AlGaAs-laser [7]
- 5/347 • • • in  $A_{II}B_{VI}$  compounds, e.g. ZnCdSe-laser [7]
- 5/36 • • comprising organic materials [2006.01]
- 5/40 • Arrangement of two or more semiconductor lasers, not provided for in groups H01S 5/02-H01S 5/30 (H01S 5/50 takes precedence) [7]
- 5/42 • • Arrays of surface emitting lasers [7]
- 5/50 • Amplifier structures not provided for in groups H01S 5/02-H01S 5/30 [7]