

## 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.
- 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]