

Title (en)
DIODE-PUMPED SOLID-STATE THIN SLAB LASER

Title (de)
DIODENGEPUMPTER DÜNNER SCHEIBENFÖRMIGER FESTKÖRPERLASER

Title (fr)
LASER SOLIDE A PLAQUE MINCE A POMPE PAR DIODE

Publication
EP 1459415 A2 20040922 (EN)

Application
EP 02795632 A 20021113

Priority
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Abstract (en)
[origin: WO03043144A2] An edge-pumped solid state thin slab laser apparatus is disclosed that is power scalable to well over 150 W for either multimode or near single transverse mode operation. A slab thickness is selected that is small enough to minimize thermal effects for a straight through beam yet large enough to allow efficient direct coupling of pump light from high power diode array stacks while also keeping the gain to within manageable levels for pulsed operation. Cooling of the slab is provided conductively, preferably by contact with metal blocks of high thermal conductivity. The edge-pumped solid state thin slab laser provides a near-one dimensional temperature gradient and heat flow direction that is perpendicular to the laser signal plane of propagation. The width of the slab is selected so as to maximize pump absorption length for a given laser material and both one and two-sided pumping schemes can be accommodated by the basic slab laser platform, depending on power, mode and beam quality requirements. The output power from the edge-pumped thin slab is generally scalable with slab length and the power available from diode array stacks used to pump the slab. The broad faces of the slab comprising the active medium may be coated with a material that is reflective at the pump wavelength or the slab can be sandwiched between two layers of dielectric of lower index of refraction so as to allow guiding of the pump light for better homogenization of the absorption, and hence the gain profile.
[origin: WO03043144A2] An edge-pumped solid state thin slab laser apparatus is disclosed that is power scalable to well over 150 W for either multimode or near single transverse mode operation. A slab thickness is selected that is small enough to minimize thermal effects for a straight through beam yet large enough to allow efficient direct coupling of pump light from high power diode array stacks while also keeping the gain to within manageable levels for pulsed operation. Cooling of the slab is provided conductively, preferably by contact with metal blocks of high thermal conductivity. The edge-pumped solid state thin slab laser provides a near-one dimensional temperature gradient and heat flow direction that is perpendicular to the laser signal plane of propagation. The width of the slab is selected so as to maximize pump absorption length for a given laser material and both one and two-sided pumping schemes can be accommodated by the basic slab laser platform, depending on power, mode and beam quality requirements. The output power from the edge-pumped thin slab is generally scalable with slab length and the power available from diode array stacks used to pump the slab. The broad faces of the slab comprising the active medium may be coated with a material that is reflective at the pump wavelength or the slab can be sandwiched between two layers of dielectric of lower index of refraction so as to allow guiding of the pump light for better homogenization of the absorption, and hence the gain profile.

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