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(19) **United States**(12) **Patent Application Publication** (10) **Pub. No.: US 2023/0231361 A1**
Yu et al. (43) **Pub. Date: Jul. 20, 2023**(54) **MINIATURIZED MASTER OSCILLATOR
POWER-AMPLIFIER STRUCTURE
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2302/00 (2013.01)(57) **ABSTRACT**

The present disclosure discloses a miniaturized MOPA structure DPSSL (Diode Pumped Solid State Laser), which comprises a laser oscillator module and a laser amplifier module. The laser oscillator module consists of a seed laser and its collimating system, and the laser amplifier module consists of a laser pump module and a laser gain element. The seed laser with high beam quality is collimated by collimation system, then input into the gain element; the pump laser is pumped into the gain element via end pump or side pump mode. The seed laser beam transmits into the gain medium and is reflected by the interface several times with the "Zigzag" path, which makes the seed laser fully gained and amplified, finally achieving high power and high beam quality laser output.

In this present disclosure, the laser gain material is doped with different rare-earth ion concentrations and processed into different shapes. Some polishing surfaces of the gain material are deposited with different coatings including HR coating and AR coating, on the one hand, to improve the absorption efficiency of the pump laser, on the other hand, to make the seeds laser in the gain element achieve longer transmission distance by Zigzag transmission path, so that the energy in the gain medium can be fully extracted. And finally, achieve high power laser output.

The present disclosure can adopt the host material doped at least at the same time with Er and Yb elements as the laser gain medium, adopt high-quality 1.55-micron or other medium emission peak band seed laser source as well as end or side pump mode, and can realize the laser output with high power and high beam quality.

Compared with the MOPA laser of the prior art, the present disclosure has the advantages of simple structure, small volume, and low cost.

