

[23/10/07 - 15:45h - Room 1]

High-power, diode-side-pumped Nd:YLF laser with a novel multiple pass resonator, MARCO ANTONIO FERRARI, EDUARDO COLOMBO SOUSA, NIKLAUS URSUS WETTER, IZILDA MÁRCIA RANIERE, SONIA LÍCIA BALDOCHI, EDUARDO LANDULFO, *IPEN/USP - SP - BRAZIL* ■ Some properties of YLF have shown to be superior to other host materials for certain applications. Nd:YLF has a longer fluorescence lifetime and a lower cross-section, which offers advantages in pulsed and Q-switched operation. YLF also has superior thermo-optical characteristics because of its natural birefringence that eliminates thermal depolarization and it has weak thermal lensing.

We describe the performance during qcw operation of a diode side pumped Nd:YLF laser using a novel compact cavity with multiple pass through the gain media by total internal reflection, demonstrating its laser efficiency and beam quality. This cavity serves for the purpose of a compact LIDAR system for pollution monitoring in the Amazon basin.

The Nd:YLF crystal was grown at our in-home crystal growth facility with 0.8mol% concentration of neodymium. Then a crystal slab was cut and polished with dimensions of 14 x 13 x 4 mm³. The resonator was mounted using a multiple pass configuration where the intracavity beam bounces at the pumped faces by means of total internal reflection. A very compact and stable cavity with only two mirrors was used. The pump sources were two 100W

efficiency and beam quality of the laser. Also, the laser action reduces the heat generation, because the bounce acts as an effective cooling mechanism for the pump surface where the highest temperature gradients are expected.

In this work we present a novel design of compact diode-side-pumped slab laser using Nd:YLF in a resonator with multiple pass through the gain media by total internal reflection at the pumped face. We describe the performance during qcw operation, showing the input-output power behavior. In all cases we demonstrate good agreement between the measured and the calculated beam quality.