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Monolithic high energy picosecond laser sources for laser ranging applications

Short pulsed lasers are a vital component in laser ranging installations. Since 1995 InnoLas Laser has been developing, producing and distributing short pulsed nanosecond (ns) and picosecond (ps) laser sources for various scientific, medical and industrial applications.

In this paper we present a new line of picosecond high energy laser sources for Lunar Ranging and Satellite Laser Ranging (SLR) as well as nanosecond lasers for Tracking of Space Debris.

Based on an industrial, fiber based picosecond seed source with 10 – 100 ps pulse duration, different amplifier schemes can be implemented in a common laser head ensuring alignment stability. Flashlamp pumped amplifier systems offer very high pulse energies of up to 100 mJ at 532 nm and 10 ps pulse duration, but are limited in pulse frequency to 30 Hz. Alternatively, DPSS amplifiers enable high repetition rates of 50 - 1000 Hz and >5 W average power while allowing long service intervals (>>2 billion pulses). This broad specification range offers solutions for both Lunar and Satellite Laser Ranging.

For Tracking of Space Debris, Q-switched nanosecond lasers both lamp-pumped with highest pulse energies of >1500 mJ at 532nm as well as diode-pumped with up to 100 W average power or up to 1000 Hz pulse frequency are available.

One key feature of all InnoLas laser sources is their monolithic housing which is machined from one block of aluminum for excellent mechanical stability. All laser system can be customized to individual requirements due a flexible layout of the monolithic systems.