

# A 100 Hz Repetition Rate Laser System with TeraWatt Peak Power Pulses

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Laser systems producing ultrashort pulses, operating in large-scale facilities like APOLLON, BELLA, ELI *etc.*, are usually heavily booked for secondary source developments and user experiments. However, the need for scientific and technological developments related to high average power laser-matter interactions, *e.g.*, target systems, diagnostics *etc.*, calls for frequent experimental testing with appropriate laser sources.

We have developed a variable output 100 Hz laser system based on the negatively and positively chirped pulse amplification technique, which is ideal for the testing of high repetition rate target systems, in University environment. Our versatile laser system was designed to utilize the latest achievements in short pulse amplification, based on Ti:Sa as the gain media. The few-cycle output provides pulses with 7.1 fs and 0.25 mJ, while the power output supports 26 fs pulses with a pulse energy of around 50 mJ. The energy as well as the pulse duration stability are below 1%. This, combined with a pointing stability around 25% of the diffraction-limited spot size, makes the system ideal for femtosecond material processing. Results of development of high repetition rate target systems are also shown.