

# A MASTER-OSCILLATOR POWER AMPLIFIER

## Educational system for amplifying and characterizing a pulsed laser

An amplifier and measurement system was designed to keep academic education on track with industrial and scientific developments.

This system aims to clarify two major aspects of state-of-the-art short-pulse laser technology: the functionality of a Master-Oscillator Power-Amplifier (MOPA) based on an optically pumped Ytterbium-doped fiber, and the technique of pulse width

measurements utilizing an intensity autocorrelator. Together, these components form a complex lab course which covers the necessary topics to understand these technologies.

The MOPA-system amplifies the pulses of a picosecond diode laser (the seed laser) and gives the opportunity to characterize all of the essential parameters of its operation; i.e. the pump-power dependent forward and backward propagating amplified spontaneous emission (ASE), and the time-integral power of the amplified pulses. In addition, the spectral differences between lasing and ASE and the side-fluorescence spectrum of the pumped fiber can be analyzed. The temporal pulse width of the amplified pulses can be measured with the intensity autocorrelator in order to calculate the actual peak pulse power.

To understand the interactions between different experimental parameters, the pump laser is adjustable in output power and center wavelength and the seed laser is adjustable in output power and repetition rate. Overall, this educational platform gives the opportunity to vary and measure a large number of system parameters and helps to connect theoretical background with practical experience.

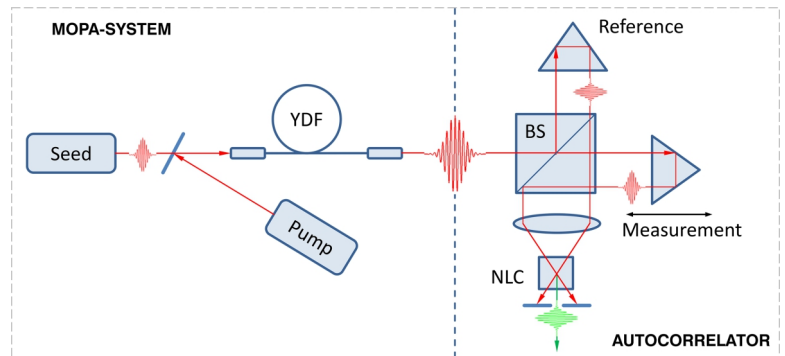


Fig. 5: Schematic of the MOPA-System with attached autocorrelator.

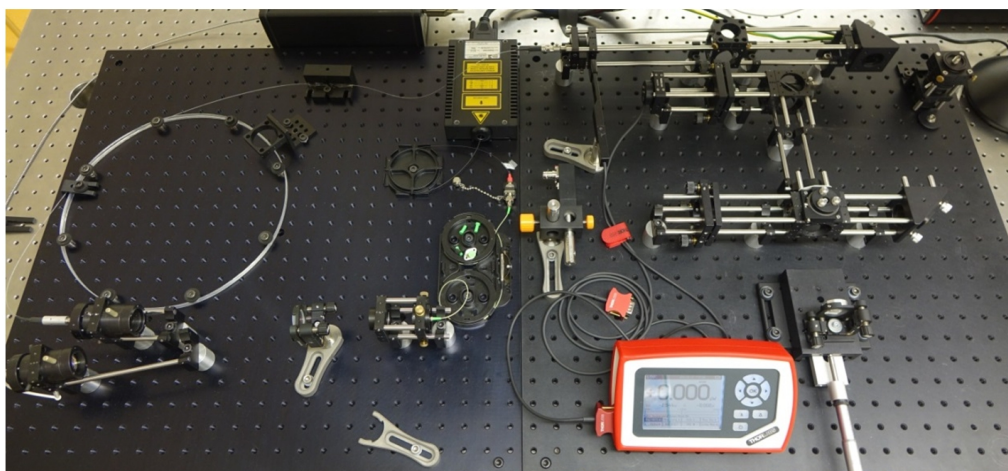


Fig. 6: Experimental lab course in the training hall of the Westsächsische Hochschule Zwickau.