

Setting-up a Yb:YLF femtosecond laser oscillator

Femtosecond lasers have found a wide variety of applications in science and industry. For example, they are used for recording ultrafast molecular movies and for high-precision materials processing. The aim of the summer project is to set-up a femtosecond laser oscillator based on the active material Yb:YLF, which offers exceptional power and energy scalability when cooled to cryogenic temperatures [1]. The project will provide theoretical and practical knowledge in laser engineering and femtosecond optics. Topics include resonator design, passive mode locking, and dispersion control. Previous work [2,3] can be used as a guideline for the experiments. The student will work in state-of-the-art ultrafast laser laboratories and will have access to all necessary diagnostic tools to characterize the developed light sources. The project results can later be used to build a laser amplifier chain.

[1] Demirbas et al., Optics Letters 46, 3865 (2021). [<https://doi.org/10.1364/OL.430651>]

[2] Coluccelli et al., Optics Express 16, 2922 (2008). [<https://doi.org/10.1364/OE.16.002922>]

[3] Demirbas et al., Optics Letters 47, 933 (2022). [<https://doi.org/10.1364/OL.450706>]

Group

FS-LA

Project Category

A5. Lasers and optics

Special Qualifications

DESY Site

Hamburg

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