Ultra-intense and ultra-short laser and its applications in electron accelerator at SIOM

Yuxin Leng, Yi Xu, Wentao Wang, Xiaoyan Liang, Ruxin Li

State Key Laboratory of High Field Laser Physics, Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences, Shanghai 201800, China

In this presentation, we will report the new progress of ultra-intense and ultra-short laser for electron accelerator and related laser driven free electron lasing. With the improvement of a home build Ti:sapphire femtosecond laser, we could obtain very stable laser wakefield electron acceleration [1]. Then the laser driven electron accelerator has been achieved with near GeV energy and <1% energy spread [2]. Finally, a free-electron lasing using a laser wakefield electron accelerator has been demonstrated [3]. That will benefit the performance improvement of Shanghai Superintense Ultrafast Laser Facility (SULF) in future.

1. Opt. Laser Technol. 131, 106453, 2020.
2. Phys. Rev. Lett. 126, 214801, 2021.
3. Nature 595, 516-520, 2021.