

به نام خدا



دانشگاه صنعتی اصفهان  
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سمینار هفتگی

## Generation and Measurement of ultrashort free electron laser pulse in ultraviolet (EUV) to the soft-X-ray region

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خلاصه:

Over the last few years tremendous progress has been gained in generation and application of the ultrashort radiation pulse. Recently, free-electron lasers generating ultrashort pulses with high peak power from the extreme ultraviolet (EUV) to the soft-X-ray region are opening a wide range of new scientific opportunities. This timescale allows the probing of ultrafast, out-of-equilibrium dynamics and the high intensities are key for nonlinear optics. Soft-X-ray wavelengths can access core electrons of the extremely important light elements carbon, nitrogen and oxygen, providing chemical sensitivity; fast pulses can drive the system under study into a regime where the transient excitation is not depleted by competing fast channels, such as Auger Decay. Externally seeded free-electron lasers produce coherent pulses that can be synchronized with femtosecond accuracy. In this presentation we will present the new achievements of the seeded FEL pulse in generation of the coherent ultrashort pulses in the range of EUV to the soft-X-ray. In particular, we demonstrate the recently successful robust experiment in FERMI@Trieste, in which we have generated few-femtosecond extreme-ultraviolet pulses, and we measured the pulse duration by autocorrelation method. We proved the pulse duration matches the Fourier transform limit of the spectral intensity distribution.

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