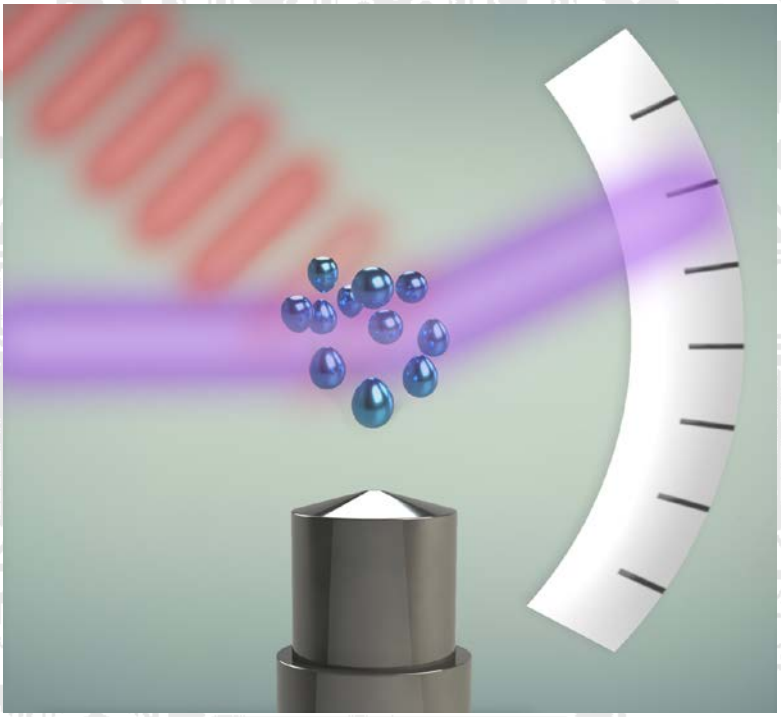
PHYSIKALISCHES KOLLOQUIUM

AM 26. NOVEMBER 2018 UM 17 UHR C.T.

IM GROßEN HÖRSAAL



OPTO-OPTICAL MODULATION OF COHERENT XUV PULSES

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There is a profound, almost symbiotic, relation between electrons and photons. When light, i.e., photons, interacts with matter the electrons in the material will start to move and oscillate. When a charged particle, such as an electron, oscillates it will act as a dipole and emit light. We propose to utilize this symbiotic relation and extend the control of light and matter to the extreme ultraviolet (XUV) region using the newly developed XUV opto-optical modulator.

To control light with short wavelengths is challenging since the tools available for visible light do not work. We present a technique to control the phase of light that works also in the XUV wavelength region. We do it using the recently demonstrated opto-optical modulator, a method for controlling the direction, duration and timing of XUV pulses using infrared (IR) control pulses [1]. Coherent XUV light is used to promote an ensemble of atoms to a superposition of the ground state and a series of excited states and the IR pulse is used to control the phase of the light emitted by the excited atoms. The technique can be used to steer or split XUV pulses, but it can also be used to probe both the phase and amplitude of excited states in atoms or molecules.

[1] S. Bengtsson, et al., Nature Photonics **11**, 252-258 (2017)