

**ВТОРНИК, 26.09.2023 Г., 14:15 ЧАСА, ЗАЛА А-209**

**КАТЕДРА КВАНТОВА ЕЛЕКТРОНИКА**

**кани всички интересуващи се на лекция на тема**

**Quantum Optics Meets Strong Field Physics:**

**New Regimes of Coherent X-ray Generation with Strong Electron Correlation Dynamics and Attosecond Rabi Oscillations**

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**Abstract:** Ultrafast imaging and spectroscopies using coherent EUV and X-ray light based on the extreme nonlinear process of high harmonic generation are already addressing grand challenges in complex molecular systems, advanced nanomaterials, and plasmas. The exquisite quantum control of the attosecond dynamics of the rescattering electrons in this upconversion process makes it possible to sculpt the classical and quantum properties of the light with unprecedented tunability of the spectral, spatial, temporal shape, and spin and orbital angular momentum state. The full spatial and temporal coherence of this unique light allows for multi-dimensional imaging at the spatio-temporal extreme with 4D resolution of nanometers and femtoseconds, including access to an effective 5th dimension – the periodic table of elements - due the X-ray absorption fingerprinting with elemental and chemical specificity.

In this talk, I will present two novel regimes of coherent X-ray generation using short wavelength UV and EUV driving lasers where the design of the light properties is dominated by the quantum dynamics of the entangled electrons in a simple He atomic system. Interestingly, the physics of these regimes extend beyond the three-step high harmonic model.