



Alejandro Saenz

(Humboldt-Universität zu Berlin)

Simulating Ultrafast Attosecond Physics with Ultraslow Atoms

Presently, there is an evident trend to develop light sources with extreme peak intensities or ultra-short pulse durations (down to the attosecond regime). In the first part of the talk the planned applications of these novel light sources will be briefly sketched, together with the accompanying theoretical challenges. The second part of the talk will briefly introduce a completely different, but also very popular and extreme regime, the one of ultracold atoms. Here, the enormous level of control of such quantum systems makes them promising candidates for quantum simulators or even quantum computers. As will be demonstrated, the flexibility of the ultracold atoms allows in fact for a simulation of the attosecond physics occurring in laser fields of very high peak intensities. In turn, this newly proposed quantum simulator even provides useful insight in the physics of ultracold atoms.

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Universität Ulm, Raum N24/252
Albert-Einstein-Allee 11, 89081 Ulm

