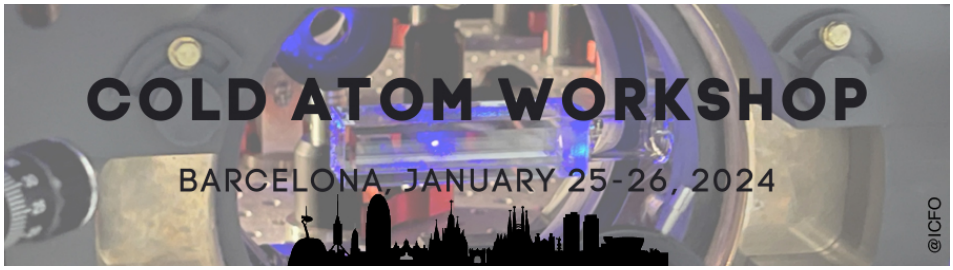


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# Analog simulators for high harmonic generation

*Friday 26 January 2024 11:50 (20 minutes)*

The demanding experimental access to the ultrafast dynamics of materials challenges our understanding of their electronic response to applied strong laser fields. In this work, we show that trapped ultracold atoms with highly controllable potentials can become an enabling tool to describe phenomena in a scenario where some effects are more easily accessible and twelve orders of magnitude slower. For this purpose, we characterize the mapping between the attoscience platform and atomic simulators, and propose an experimental protocol to simulate the emission yield of High Harmonic Generation, a regime that has so far been elusive to cold atom simulation. As we illustrate, the benchmark offered by these simulators can provide new insights on the conversion efficiency of extended and short nuclear potentials, as well as the response to applied elliptical polarized fields or ultrashort few-cycle pulses. We will also review recent work done in the group where long-range interactions can lead to new phenomena in problems related to quantum transport, ultrafast processes and frustrated phases of matter.

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