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Structured EUV/soft x-ray attosecond pulses

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The quest of achieving complete control over the generation of coherent x-ray sources has driven the efforts over the scientific community during the last years due to their unique ability to capture the fastest electronic and spin dynamics in a wide variety of materials. Among other x-ray sources, high-harmonic generation (HHG) stands as a robust mechanism to generate highly spatially and temporally coherent radiation from the extreme-ultraviolet (EUV) to the soft x-ray regimes, with exquisite temporal accuracy in the attosecond regime. Remarkably, such control is acquired through a highly nonlinear up-conversion process, where the properties of an infrared driving field are mapped into high-frequency harmonics. However, such mapping process is far from trivial.
In this contribution we will review the recent advances in the generation of structured coherent EUV/soft x-ray pulses through HHG. In particular, the use of structured driving beams with controlled spin and/or orbital angular momentum has opened exciting opportunities to harness the properties of the high-order harmonics and attosecond pulses [1], such as their polarization state [2-5], their self-torque [6], or their spectral and focusing properties [7].

References
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About the speaker:
Dr. Carlos Hernández-García (36) is a Senior Researcher (Ramón y Cajal Fellow), at Universidad de Salamanca (Spain). PI of the ERC Starting Grant project ATTOSTRUCTURA. More than 50 peer-review articles indexed in JCR (including 3 Science, 3 Nature Photonics, 2 PNAS, 5 PRL, 3 Optica, among others). Recipient of the 2019 Fresnel Prize, awarded by the European Physical Society (EPS) and the RSEF-BBVA Physics Prize 2019 for Young Researchers, awarded by the Royal Spanish Society and the BBVA Foundation.

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