Abstract Submitted
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Conservation of Torus-Knot Angular Momentum in High-Harmonic Generation Driven by Fields with Spin-Orbit Mixing EMILIO PISANTY, ICFO-The Institute of Photonic Sciences, CARLOS HERNNDEZ-GARCA, LAURA REGO, University of Salamanca, ANTONIO PICN, ICFO-The Institute of Photonic Sciences, JULIO SAN ROMN, University of Salamanca, GERARD J. MACHADO, VERNICA VICUA-HERNNDEZ, ALESSIO CELI, ICFO-The Institute of Photonic Sciences, KEVIN M. DORNEY, HENRY C. KAPTEYN, MARGARET M. MURNANE, University of Colorado Boulder, JUAN P. TORRES, ICFO-The Institute of Photonic Sciences, LUIS PLAJA, University of Salamanca,, MACIEJ LEWENSTEIN, ICFO-The Institute of Photonic Sciences — The fundamental polarization singularities of light are symmetric under coordinated rotations: transformations which rotate the spatial dependence by an angle θ and the polarization by a fraction $\gamma\theta$ of that angle, as generated by 'mixed' angular momenta of the form $L + \gamma S$. Generically, the coordination parameter γ has been thought to be restricted to integer or half-integer values. We show that this constraint is an artifact, which originates from the restriction to monochromatic fields, and that a wider variety of singularities can be obtained using the methods of strong-field physics - in particular, the time-domain view on polychromatic fields. We show that these new optical singularities present novel topologies, and how they can be characterized analytically and experimentally. Finally, we explore how these topologies interact with strong-field drivers, by showing that the generator for the symmetry group of these singularities - a mixed type of 'torus-knot' angular momentum - is conserved in nonlinear optical interactions. 1. Nat. Photon. 13, 569 (2019) 2. Phys. Rev. Lett. 122, 203201 (2019)

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