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High-harmonic generation in solids with and without topological edge states DIETER BAUER, University of Rostock, Institute of Physics, KENNETH HANSEN, Department of Physics and Astronomy, Aarhus University, HELENA DRÜEKE, University of Rostock, Institute of Physics — High-harmonic generation (HHG) in the two topological phases of a finite, one-dimensional, periodic structure is investigated using a self-consistent time-dependent density functional theory (TDDFT) approach. For harmonic photon energies smaller than the band gap, the harmonic yield is found to differ up to fourteen orders of magnitude for the two topological phases. This giant topological effect is explained by the degree of destructive interference in the harmonic emission of all valence-band (and edge-state) electrons, which strongly depends on whether topological edge states are present or not. The combination of strong-field laser physics with topological condensed matter opens up new possibilities to control electronically strong-field-based light or particle sources or—vice versa—to steer by all optical means topological electronics.

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