

Abstract Submitted
for the DAMOP20 Meeting of
The American Physical Society

High-Harmonic Generation in Topological Condensed Matter

CHRISTOPH JUERSS, DANIEL MOOS, DIETER BAUER, University of Rostock, Germany — Topological properties of solids can have a huge influence on the generation of high-harmonics. Such effects were first observed in one-dimensional linear chains using TDDFT simulations [1,2]. The harmonic yield of the topological and trivial phase differ by many orders of magnitude for energies below the band gap. The same difference is observed using a tight-binding approach [3]. We use this simplified tight-binding description - which is both computationally cheaper and more accessible to analytical treatments - to simulate one-dimensional chains and topological, graphene-like systems in laser fields. The bulk-boundary correspondence asserts that a nonvanishing topological invariant of the bulk results in topologically protected edge states in the corresponding finite system. The edge states play an important role in the high-harmonic generation process. As edge states are absent with periodic boundary conditions (bulk), differences in the spectra with and without periodic boundary conditions are presented and explained.

- [1] D. Bauer and K. K. Hansen, Phys. Rev. Lett. **120**, 177401 (2018)
- [2] H. Drüeke and D. Bauer, Phys. Rev. A **99**, 053402 (2019)
- [3] C. Jürß and D. Bauer, Phys. Rev. B **99**, 195428 (2019)

Christoph Juerss
University of Rostock, Germany

Date submitted: 30 Jan 2020

Electronic form version 1.4