Abstract Submitted
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Interplay of temperature, spatial dispersion, and topology in silicene Casimir interactions[1] LILIA WOODS, PABLO RODRIGUEZ-LOPEZ, University of South Florida, WILTON KORT-KAMP, DIEGO DALVIT, Los Alamos National Laboratory — Graphene materials have given an impetus to the field of electromagnetic fluctuation interactions, such as Casimir forces. The discovery of unusual distance asymptotics, pronounced thermal effects, and strong dependence on the chemical potential in graphene Casimir interactions have shown new directions for control of this universal force. Recently discovered silicene, a graphene-like material with staggered lattice and significant spin-orbit coupling, offers new opportunities to re-evaluate these unusual Casimir interaction functionalities. Utilizing the Lifshitz formalism we investigate how the spatial dispersion and temperature affect the Casimir interaction in silicene undergoing various topological phase transitions under an applied electric field and laser illumination. This study is facilitated by the comprehensive examination of the conductivity components calculated via the Kubo formalism. We show that the interplay between temperature, spatial dispersion, and topology result in novel features in Casimir interactions involving staggered graphene-like lattices.

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