Abstract Submitted
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Temperature-dependent levitation of a graphene flake due to Casimir forces[1] ANH PHAN, DAVID DROSDOFF, LILIA WOODS, Department of Physics, University of South Florida, Tampa, Florida 33620, USA, IGOR BONDAREV, Physics Department, North Carolina Central, Durham, North Carolina 27707, USA, NGUYEN VIET, Institute of Physics, 10 Daotan, Badinh, Hanoi, Vietnam — We present theoretical investigations of temperature-dependent Casimir interactions of a graphene flake between substrates in a fluid. By properly choosing the materials, we propose that the graphene can be suspended in the fluid due to the balance between the Casimir, buoyancy and gravitational forces. The graphene properties, such as the Dirac-like nature of the carriers and universal optical conductivity, have a profound effect on the Casimir force making it completely thermal at room temperature. Since thermal contributions to the Casimir interaction in most materials are usually small, the graphene system offers a unique opportunity to demonstrate such effects without going to extreme temperatures. We show that the equilibrium position of the suspended flake is temperature dependent. We suggest that this maybe a promising system for observing thermal Casimir effects via levitation.

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Anh Phan
Department of Physics, University of South Florida,
Tampa, Florida 33620, USA

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