

Abstract Submitted
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Casimir-Polder Force Reversal with Metamaterials VENKATESH PAPPAKRISHNAN, DENTCHO GENOV, Louisiana Tech University — A promising system design aiming to demonstrate Casimir-Polder force (CPF) reversal is proposed. The constraints when using naturally available materials in designing the system with air as an intermediate medium is resolved by using artificial electromagnetic materials. The parametric space in terms of the plate's magnetic and dielectric plasma frequencies, gap thickness and temperature is investigated. The parametric domain for achieving CPF reversal is obtained. Furthermore, a simple analytical expression for the CPF is derived. The analytical expression accurately describes the large and short distance asymptotics and allows extraction of important parameters such as lower and upper cutoff gap distances that define the repulsive force window. This study could possibly lead us to design of quantum levitation system, frictionless bio-fluid transport devices, etc.

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