

Abstract Submitted
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Giant vacuum forces via transmission lines EPHRAIM SHAHMOON¹, Weizmann institute of Science, IGOR MAZETS, Atominstitut, TU Wien, Vienna, Austria, GERSHON KURIZKI, Weizmann institute of Science — Quantum electromagnetic fluctuations induce forces between neutral particles, namely, the van der Waals (vdW) and Casimir interactions. Here we show that these fundamental interactions can be enhanced by many orders of magnitude upon changing the character of the mediating vacuum photon-modes. We consider two dipoles in the vicinity of any standard electric transmission line and find analytically that the interaction scales non-trivially with the inter-dipolar distance, resulting in a strong and long-range interaction. This may have profound implications on the non-additivity of vdW and Casimir interactions in many-particle systems, and opens the door for Casimir Physics in 1d. We discuss the possibilities of measuring this effect, e.g. in a coplanar waveguide line.

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