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Three-body Casimir effects and repulsion[1] KIMBALL MILTON, University of Oklahoma — The Casimir effect arises from quantum fluctuations in the electromagnetic field and results in forces between atoms (van der Waals and Casimir-Polder forces), between atoms and surfaces (Casimir-Polder forces), and between conducting and dielectric surfaces (Casimir-Lifshitz forces). In the past few years, there has been a revolution in our ability to calculate forces between different bodies. Pairwise summation of interatomic forces in general is very inadequate to describe the physics. In particular three-body effects can be large. Two-body forces, for example, between a dielectric sphere and a dielectric plane, can be calculated by a combination of analytic and numerical techniques; non-monotonic effects can occur when three-body interactions are considered. Anisotropic objects with ordinary electrical properties can give rise to repulsive quantum vacuum forces, which might have application in nanotechnology. This talk will focus on the overlap of the three-body force regime and Casimir repulsion, for example, the interaction between an anisotropically polarizable atom and a pair of facing conducting wedges, or two conducting half-planes constituting an aperture.

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