

Abstract Submitted
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Numerical Evaluation of the Casimir Force in Concave Piston Geometries¹ MARTIN SCHADEN, Rutgers University in Newark — Using a modified worldline approach[1] for a massless scalar field satisfying Dirichlet boundary conditions, I numerically calculate the Casimir force on a piston in a *closed concave* cavity of various shapes. There are no contributions from arbitrarily short paths and the Casimir *force* on the piston is finite for all systems considered. I relate the Casimir interaction energy of concave cavities to a probability measure on the convex hulls of Brownian bridges. The resulting algorithm for Casimir forces in concave geometries is numerically stable, fast and very accurate. The results depend only on the number of hulls and points used and extrapolate readily to the continuum limit. I compare some of these numerical results to semiclassical estimates of the force[2] in similar piston geometries. [1] H. Gies, K. Langfeld and L. Moyaerts, JHEP 0306, 018 (2003); H. Gies and K. Klingmuller, Phys. Rev. D74, 045002 (2006). [2] L. Mateescu and M. Schaden, [quant-ph/0705.3435].

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