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Macroscopic Approach to Test Method for Improving Yukawa-Like Interaction Limits THOMAS BSAIBES, Indiana University - Purdue University Indianapolis, LUIS PIRES, Instituto de Fisica, Universidade Federal do Rio de Janeiro and Indiana University - Purdue University Indianapolis, RICARDO DECCA, Indiana University - Purdue University Indianapolis — Yukawa-like interactions arise in many extensions to the standard model. These hypothetical interactions result in a force mediated by a new boson. The potential of a theorized Yukawa-like force between two point masses is $V(r) = -\alpha \frac{Gm_1m_2}{r} e^{-r/\lambda}$, where G is Newton's gravitational constant, r is the separation between the masses, α is the relative strength, and λ is the characteristic length of the interaction. Many studies placed limits on α across a wide range of λ, however for λ below 1 μm, the constraint set on α is poor. A previous study used a spherical test mass; a possible 100-fold improvement to the limit on α in the submicron regime of λ may be achieved using a cylindrical test mass. A major challenge in using a cylinder is the alignment of the cylinder with respect to the planar source mass. A scaled up version of the experiment has been constructed to test if the capacitance between a cylinder and a plate can be used to determine the cylinder's alignment. Once the technique is refined it will be used to align a 500 μm cylinder with the planar source mass. This talk will cover the progress made towards using capacitance as an alignment indicator.

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