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A parallel plate approach to force metrology

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Understanding dark energy and dark matter is one of the most pressing problems in present day physics. In recent years, scalar field models have become popular as candidate theories. As the corresponding hypothetical particles have low masses, collider experiments may not be suitable to search for them. Force metrology at sub-mm scales, on the other hand has proven to be useful in this respect. Over the past decade, tight limits on most candidate models have been set but no confirmed signals have been found.

The Casimir And Non-Newtonian Force EXperiment (CANNEX) presently is the only force metrology experiment working in the geometry of plane parallel plates. This geometry maximizes the force generation between the two test masses, and thereby the sensitivity with respect to a range of dark matter, dark energy, and interfacial Casimir forces. In the present talk, we report on the recently completed proof of principle, discuss the status of the experiment, and give an overview of the manifold opportunities for measurements that are about to commence soon.

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