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Atomic-Physics Searches for Dark Energy

Monday, October 17, 2016 3:00 PM (30 minutes)

We will present new techniques to detect these particles, relying on interferometry with cold atoms in vacuum. The low density of such atoms compared to bulk matter avoids triggering some screening mechanisms, while the high sensitivity of the interferometer overcomes other screening mechanisms by brute force. We will show limits ruling out substantial regions of parameter space for chameleons and symmetrons [Science 349, 849 (2015)] and argue that an interferometer with 10,000 fold improved sensitivity will be able to search the gamut of screened scalar fields. A positive identification would revolutionize particle physics and cosmology, but even a null result would have important implications for our understanding of the dark sector.

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