Poster Session #A
Laboratory tests of gravitation

A04

Search for scalar field dark matter with the GEO 600 gravitational wave detector

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Low-mass (sub-eV) scalar field DM may induce apparent oscillations of fundamental constants, where the frequency is determined by the field's mass, and the amplitude is set by the strength of the coupling to the SM and the local dark matter density. These oscillations of fundamental constants would produce corresponding oscillations of the size and the index of refraction of solids. Laser interferometers, such as gravitational wave (GW) detectors, are highly sensitive to changes in the size and index of refraction of the main beamsplitter. Therefore, examining data from GW detectors for the presence of continuous oscillatory signals allows for the exploration of previously unconstrained regions of the parameter space of scalar field DM. We present the motivation and methodology for a scalar field DM search in data from the GEO,600 GW detector, the results of which will be published soon.