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Probing ultralight dark-photon dark matter with asteroids

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Ultralight dark-photon dark matter coupled to the Standard Model (through e.g. B or $B-L$ charges) would supply a new force that oscillates with a frequency set by the dark photon mass. Such forces result in fluctuations in the separation between inertial test masses, a physical quantity tracked in many gravitational-wave (GW) detectors. A recent GW detection proposal based on monitoring the separation of certain asteroids in the inner Solar System would be sensitive to frequencies in the experimentally-challenging μHz band. In this talk, I discuss how that proposal would also enable access to new parameter space for dark-photon dark matter, well beyond current best limits.

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