

Picolensing as a probe of compact dark matter

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The gravitational lensing parallax of gamma-ray bursts (GRB), also known as picolensing, is a promising probe of compact dark matter, such as primordial black holes (PBH). A future space mission consisting of two X-ray/gamma-ray detectors in the Swift/BAT class can probe PBHs in the asteroid-mass window — a range of masses that has been notoriously hard to constrain by any other means. I will discuss the robustness of the projected reach of such mission with respect to the astrophysical uncertainties, most important being the uncertainty in observed GRB angular sizes. I will show that a setup with the separation between the two detectors on the order of the Earth–L2 distance makes such a mission robust. Baselines on the order of an astronomical unit further extend the reach to higher masses with the sensitivity competitive or exceeding the existing microlensing constraints. Implications of these results to other types of compact dark matter will be briefly discussed.

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