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Gravitational Microlensing by Dark Matter Subhalos and Boson Stars

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Multiple microlensing surveys have been conducted to place limits on primordial black holes in nearby dark matter halos. We show that these existing limits on PBHs can be recast to constrain dark matter lenses that are more spatially extended than PBHs. As two representative cases, we examine NFW subhalos and boson stars, which are predicted in many models such as axion miniclusters and axion stars. For the Subaru-HSC survey, the finite size of the source stars must also be considered. we find that the survey can probe NFW subhalos up to O(100) solar radii and boson stars up to O(1000) solar radii.

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