

Abstract Submitted  
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**Reverse Direct Detection: Cosmic Ray Tests of Light Dark Matter Elastic Scattering**<sup>1</sup> CHRISTOPHER CAPPIELLO, Ohio State Univ - Columbus, KENNY NG, Weizmann Institute of Science, JOHN BEACOM, Ohio State Univ - Columbus — Many dark matter studies have considered indirect detection ( $\chi\chi \rightarrow ff$ ), direct detection ( $\chi f \rightarrow \chi f$ ), and collider searches ( $ff \rightarrow \chi\chi$ ). We propose a new strategy in searching for dark matter elastic cross section by considering cosmic-ray propagation in the galactic dark matter halo. We find that cosmic rays can lose significant fraction of their energy through scattering with dark matter ( $f\chi \rightarrow f\chi$ ). Using existing cosmic-ray data and a simple cosmic-ray propagation model, we study the qualitative effects of dark matter scattering on cosmic-ray propagation and obtain new constraints of dark matter elastic cross sections on light dark matter (keV–GeV), a regime that is difficult for traditional direct detection experiments to probe.

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