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Exoplanets as Sub-GeV Dark Matter Detectors

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We present exoplanets as new targets to discover Dark Matter (DM). Throughout the Milky Way, DM can scatter, become captured, deposit annihilation energy, and increase the heat flow within exoplanets. We estimate upcoming infrared telescope sensitivity to this scenario, finding actionable discovery or exclusion searches. Supporting evidence of a DM origin can be identified through DM-induced exoplanet heating correlated with Galactic position, and hence DM density. This provides new motivation to measure the temperature of the billions of brown dwarfs, rogue planets, and gas giants peppered throughout our Galaxy.

Summary

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