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A New Method for Determining the Local Dark Matter Density

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Determination of the Dark Matter (DM) density at the solar position is critical to direct and indirect dark matter searches. Additionally, it is important to make this determination with as few assumptions as possible, as results from direct detection searches are used to explore a wide variety of theoretical models, and hidden astrophysical assumptions could bias theoretical searches. Here we present a Jeans analysis based method for the determination of the local DM density which allows us to limit the number of assumptions we need to make. We fit vertical profiles of baryon and DM density to tracer density and velocity dispersion data via integrated Jeans equations, and from these derive the local DM density. We present tests on mock data, demonstrate the importance of the 'tilt term' which links radial and vertical motions, and also present initial investigations using SDSS and RAVE data.

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