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Interstellar Prisms: Unlocking Small Scale Dispersion Measure Variations with Pulsars

Pulsar dispersion measures have long been an important probe of the distribution of free electrons in the interstellar medium (ISM). However, the cadence of pulsar observations, combined with the uncertainty on individual dispersion measure measurements limits our ability to probe small scale variations in the ISM. Here, we present a novel method for measuring changes in dispersion measure along nearby sightlines towards a pulsar from a single observation by leveraging multiple images formed by refraction of the pulsar signal by an interstellar lens. We show how the small scale structure evolves over a series of observations, and discuss the implications for astrometry and timing.

Section

Galaxy/Extragalactic

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