

Abstract Submitted
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The Influence of HII Regions on DM Variations for PSRs J1614-2230 and J1643-1224¹ SAMANTHA ROSENFELD, Union College, SHAMI CHATTERJEE, JAMES CORDES, STELLA OCKER, Cornell University, THE NORTH AMERICAN NANOHERTZ OBSERVATORY FOR GRAVITATIONAL WAVES COLLABORATION — Pulsar dispersion measure (DM) quantifies the integrated electron column density along the line of sight. Electron density fluctuations produce DM variations that induce errors in high precision pulsar timing used by the Nanohertz Observatory for Gravitational Waves (NANOGrav). We analyze DM variations of two pulsars observed by NANOGrav, PSRs J1614-2230 and J1643-1224, to determine if the HII regions along their LOS enhance their DM variations. Both pulsars exhibit linear changes in DM that are due to the transverse motions of the LOS through density gradients in the interstellar medium (ISM). We calculate the motion of the pulsars' LOS through the HII regions and determine that the observed DM variations could trace density fluctuations on scales of astronomical units (AU) or less within the HII regions. J1614-2230 exhibits DM variations dominated by the solar wind, but both pulsars show additional periodic DM variations that are out of phase with the expected solar wind-induced fluctuations. These periodic DM variations are too large to be explained by the LOS motion through the HII regions, but could be induced by another local plasma structure that obstructs the LOS to both pulsars.

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