

ASTROPHYSICS SEMINAR SERIES

THE MAGNETIC INTERSTELLAR MEDIUM IN THREE DIMENSIONS

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The Milky Way is magnetized. Magnetic fields thread the Galaxy, influencing interstellar physics from cosmic ray propagation to star formation. The magnetic interstellar medium (ISM) is also a formidable foreground for observational cosmology, particularly for the quest to find signatures of inflation in the polarized cosmic microwave background (CMB). Despite its importance across scientific realms, the structure of the Galactic magnetic field is not well understood. Observational tracers like polarized dust emission yield only sky-projected, distance-integrated measurements of the three-dimensional magnetic structure. I will discuss new ways to probe the magnetic ISM in three dimensions, by combining high-resolution observations of Galactic neutral hydrogen (HI) with recent insights into how HI morphology encodes properties of the ambient magnetic field. This allows the construction of 3D HI-based Stokes parameter maps (Clark & Hensley 2019): a new tool for studying the structure of the Galactic magnetic field, the ISM, and the polarized foreground to the CMB.

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