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Surveying the Interstellar Magnetic Field within 40 parsecs with Polarized Starlight

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An international group of scientists is mapping the configuration of the very local interstellar magnetic field (ISMF) utilizing high-sensitivity measurements of starlight that becomes linearly polarized while traversing a medium containing magnetically aligned interstellar dust grains. High-sensitivity polarization data for over 500 nearby stars reveal that the local interstellar medium within 40 pc contains magnetic filaments, some extending over 90 degrees in angle. We discuss the relation between these filaments and kinetically-defined local interstellar clouds, and similarities between a filament and the ISMF shaping the heliosphere as deduced from the IBEX ribbon of energetic neutral hydrogen atoms. The polarizations indicate that magnetic filaments, common throughout the interstellar medium, also extend into the immediate solar environment. These new polarization data have been collected at eight observatories located in both the northern and southern hemispheres; half of the new polarization data were collected with the DIPOL instruments.

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