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Magnetic Polarization in the Dense Interstellar Medium

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Our understanding of star formation has been revolutionized by the insight that star-forming cores and hubs are embedded in complex filamentary networks. Fragmentation as well as level of star formation within these filaments differ greatly. Still, the exact role of filaments in star formation remains unclear. In particular, magnetic fields might play an important role, as indicated by well-ordered polarized dust emission that imply strong magnetic fields on large scales probed by the Planck mission. Testing whether star formation in our Galaxy proceeds in the strong or the weak magnetic field regime however requires more than an order of magnitude resolution than was possible with Planck. Far-infrared polarimetry using the HAWC+ instrument on SOFIA has become a powerful tool to image the magnetic field structure on much finer scales relevant for star formation. SIMPLIFI is a SOFIA HAWC+ Legacy program that is carrying out a systematic high resolution large-scale study of the magnetic polarization of filaments. In this talk, I will provide a brief review of insights gained from polarimetry in the dense ISM with recent facilities and present some of the first results of SIMPLIFI.

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Session Classification: Polarization and surveys, etc.