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Poster

The Karl G. Jansky Very Large Array (VLA) has a long history performing Faraday rotation (FR) studies of the solar corona. FR is the rotation of the polarization position angle when linearly polarized radiation propagates through a magnetized plasma, providing a ground-based method for probing the coronal magnetic field at heliocentric distances within 20 solar radii. Over the last year, we used the VLA to observe coronal FR at 1-2 GHz to provide important contextual information for the Parker Solar Probe (PSP). In order to enhance the scientific results from PSP, it is crucial to supplement these in situ measurements with ground-based radio remote-sensing observations. To support the PSP mission, we made VLA observations on fixed dates corresponding to PSP perihelion events 5, 6, and 7 (June 2020, September 2020, and January 2021, respectively). We observed FR through coronal plasma structures at heliocentric distances within 20 solar radii, coinciding with PSP's trajectory. By combining these VLA FR observations with magnetic field measurements from the FIELDS instrument onboard PSP, we simultaneously probe the coronal magnetic field over distances of 4.6 to 36 solar radii. Using these VLA and PSP data, we have calculated updated power-law models for the coronal magnetic field in 2020 and early 2021, ranging from a single-term interplanetary magnetic field model to a more complex dipole-quadrupole-current sheet model.

Meeting name

Whole Heliosphere and Planetary Interactions Workshop

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