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Oral

(Invited Talk)

New opportunities for the development and application of coronal tomography techniques arise as new space-borne and ground-based instrumentation becomes available. Recently, we have implemented tomographic reconstruction of the three-dimensional (3D) distribution of coronal electron density based on white light (WL) polarized brightness (pB) images of the Solar Orbiter Metis coronagraph. We selected three time intervals during 2022, and further implemented independent simultaneous reconstructions based on LASCO-C2 pB images. The Metis and C2 fields of view partially overlapped, allowing us to compare their images and the electron density reconstructions based on the two data sets. The reconstructions showed excellent agreement in terms of the shape and size of coronal structures such as streamers and coronal holes, demonstrating the suitability of the Metis synoptic program images for tomographic analysis. However, we found a systematic discrepancy in the measured brightness as well as in the reconstructed density, with a Metis-to-C2 median ratio of about 1.65 in both cases. Our analysis illustrates the value of tomography as an aid for intercalibrating solar coronagraphs because the reconstructed plasma density in the corona does not depend on an instrument's location, unlike the images obtained by it. We will also discuss new projects briefly, including combined Metis WL and Lyman-alpha tomography, which can potentially provide constraints on the three-dimensional distribution of the solar wind speed in the middle corona. Additionally, MLSO/UCoMP tomography can provide new thermodynamic diagnostics in the inner corona.

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Invited or Virtual?

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