Connecting coronal 3D electron density from tomographic reconstruction to in-situ measurements from Parker Solar Probe

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There are few possibilities to put the in-situ measurements of the coronal electron density such as obtained by the Parker Solar Probe in the context of the 3D configuration of the corona and its structure. One of them consists in using MHD models relying on synoptic maps of the photospheric magnetic field, but their accuracy is subject to questions, especially in the case of complex coronae of the maximum type. The 2D inversion of white-light coronagraphic images requires the simplified assumption of spherical symmetry of the corona which basically washes out the longitudinal variations. We will present preliminary results of a new method which makes use of the 3D time-dependent tomographic reconstruction of the coronal electron density based on accurately corrected and calibrated LASCO-C2 images of the polarized brightness of the corona. It is performed over a sliding window of 14 days (half a Carrington rotation) centered at the times of the PSP perihelion with a time interval of 4 days. The resulting “cubes” of the 3D electron density Ne are visualized from six different vantage points and with movies. The orbit of PSP is projected on a synoptic map of Ne extracted from the cubes at a heliocentric distance of 5.5 Rs; the track extends from Perihelion-5 days to Perihelion+5 days. The electron density at the heliocentric distances of PSP is extrapolated radially from the values at 5.5 Rs using an inverse square law. We will present results from the first five PSP encounters.