Megan
Kenny
University of Colorado Boulder
Craig DeForest, Southwest Research Institute
Sam Van Kooten, Southwest Research Institute
Poster
The Wide-field Imager for Parker Solar Probe (WISPR) images the inner heliosphere as Parker Solar Probe (PSP) rushes through the plasma. Near perihelion, the spacecraft's rapid speeds and proximity to linear structures in the corona enable a unique opportunity to extract locations of such features and large-scale structure near the track of the spacecraft itself. This tomographic reconstruction method relies on known perspective changes due to the rapid trajectory of PSP through the solar corona. To produce the inversions we neglect local proper motions and model the apparent kinematics of a stationary feature, from WISPR's point of view. We produce a family of analytic functions which serve as a partial basis for the vector space of WISPR image sequences; a basic change-of-basis operation yields the initial "tomogram," which constrains feature location with respect to the orbital track. For initial analyses, this tomogram corresponds to the ribbon of material whose length runs along the track of the spacecraft (over a selected window of time) and whose width runs perpendicular to that track (locally horizontal).

Having applied our tomographic tool to a synthetic image sequence, using two different approximations of the trajectory's geometry, we found that our reconstructed positions did not match known positions of the features in the image sequence. Our next step has been to build our own synthetic dataset to continue rigorously testing the tomography method. We present progress on this ray-tracing code and early applications of the tomography tool to the new synthetic dataset, with insights on future application to real WISPR data. Finally, we describe what implications this work has for understanding basic science of the corona and contextualizing other PSP measurements.
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