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The Solar Mass Ejection Imager (SMEI) 3-D reconstruction analysis has been adapted to provide similar results using STEREO HI Imagery. As intended from PUNCH, both the SMEI and STEREO analyses use information pieced together from multiple images of the sky over time to allow the tracking of structures and their placement along the line of sight. This analysis enables 3-D reconstructions of density from Thomson-scattering brightness of the heliosphere at heretofore unprecedented spatial and temporal resolutions. With STEREO, unlike SMEI, we have gotten to the point where near real time analyses of the imager data and forecasts are possible.

Here we discuss progress to date to provide a working analysis system for PUNCH that, like both the SMEI and STEREO imagery, can enable high resolution 3-D reconstructions of the inner heliosphere. With PUNCH, imagery using polarized light is expected, and this can be simulated with existing data sets to show its differences and advantages. Using synthesized Thomson–scattering polarization brightness along with Thomson-scattering brightness that is readily available from SMEI and STEREO imagery, we can determine structure location similar to the way that we expect polarized imagery to be utilized from PUNCH.
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