Bernard
Jackson
Department of Astronomy and Astrophysics, University of California, San Diego
Matthew Bracamontes, Department of Astronomy and Astrophysics, University of California, San Diego, 9500 Gilman Drive #0424, La Jolla, CA 92093-0424, USA
Benjamin Pieczynski, Department of Astronomy and Astrophysics, University of California, San Diego, 9500 Gilman Drive #0424, La Jolla, CA 92093-0424, USA
Andrew Buffington, Department of Astronomy and Astrophysics, University of California, San Diego, 9500 Gilman Drive #0424, La Jolla, CA 92093-0424, USA
Dusan Odstrcil, George Mason University, Fairfax, Virginia and NASA Goddard Spaceflight Center, Greenbelt, Maryland, USA
Oral
(Invited Virtual Talk)
UCSD’s iterative time dependent three dimensional (3-D) reconstruction program has characterized topology throughout the inner heliosphere based on interplanetary scintillation (IPS) and Thomson scattering brightness observations. For PUNCH we can test these analyses using GAMERA brightness and polarization brightness data to learn how well the 3-D reconstructions perform to reproduce a known Coronal Mass Ejection (CME) simulation. This provides a means to establish how well the 3-D reconstruction technique reproduces a known time-varying solar wind feature. However, the Solar Mass Ejection Imager (SMEI) and STEREO Heliospheric Imager (HI) brightness, provide real data that uses these instrument’s full line of sight (LoS) capability in our iterative programming. This system has been modified to provide Thomson-scattering brightness similar to that intended from PUNCH. These analyses 3-D reconstruct volumetric data that can show small scale (mesoscale) structures both in the background solar wind and in CMEs. Using these volumetric data, our modeling provides sunlight scattered as brightness and polarization brightness as viewed from Earth. From this we can then 3-D reconstruct densities from our iterative system that uses either type imagery, or the difference from the two types of imagery to again provide the same volumetric elements. Tests continue with these analyses to learn how well an unknown value of background density over time, and other sources of LoS noise including missing spatial data, affect the reconstruction of the density volumes.
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