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Oral
UCSD's iterative time dependent three-dimensional (3-D) reconstruction program characterizes solar wind topology throughout the inner heliosphere based on interplanetary scintillation (IPS) and Thomson scattering brightness observations. By cleaning up PUNCH images as best possible, we can now use these data to reconstruct solar wind density structure in 3-D over time. This is accomplished by providing one-degree data binning (smaller bins are possible) that applies a median filter to PUNCH images to remove the remaining remnants of stellar signals. In addition, a minimum map technique removes the bulk of the remaining stray light at the edges of the PUNCH images as well features that do not repeat from one image to the next. The recent UCSD tomographic program, that must complete whole lines-of-sight, can be set to the spherical resolutions desired and can operate on the best-cleaned small section of the images as well as the whole. With PUNCH polarization brightness images becoming available in the near future, these can be dealt with in the same way as those using only brightness, with the ratio of these different modes of Thomson scattering providing further structure location differentiation. Here we will show examples of the time dependent 3-D analysis we can provide to date for PUNCH-observed CMEs and the background solar wind. One interesting example is a well-observed halo CME that began near the solar surface late on 21 October 2025, moved northward, and quickly faded presumably because it was "backsided". The outward motion locations of different portions of this CME provide excellent examples of what the UCSD 3-D reconstructions are able to determine unambiguously.
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