The importance of time-dependent MHD solar wind simulations in the frame of the PUNCH mission

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Oral

In preparation of the PUNCH mission, we construct synthetic white light (WL) images of the solar wind density in the inner heliosphere based on GAMERA 3D MHD output. GAMERA is a 3D MHD code whose capabilities have been extended to perform time-dependent solar wind simulations by frequently updating the input magnetograms and thus the boundary conditions at the inner boundary of the code, offering a much more realistic reconstruction of the solar wind evolution in the heliosphere. By employing this capability, we construct synthetic WL images of the solar wind density from multiple view points (ACE, STEREO, PUNCH) and we explain the phenomena and structures of the solar wind we see there. Comparison with synthetic WL images that have been produced based on the traditional steady state MHD approach will also be presented, to appreciate the advantages of time-dependence approach.

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