



## SEMINAR 專題演講



國立中央大學 太空科學與工程學系

Department of Space Science and Engineering, National Central University

### Time

Thursday, February 27,  
2025  
13:30 – 14:30

### Place

健雄館 (科四館)

S4-917 教室

Room S4-917,  
Chien-Shiung Building

# Magnetohydrodynamic Simulation of the Solar Wind: A Comparison With Parker Solar Probe Observations

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The long-term and continuous observations of the solar wind at  $\sim 1$  AU have promoted studies of the solar wind and solar events in this area and provide “ground truth” for validating global simulation models. On the other hand, anywhere outside this region is less studied and less known because of infrequent visits. The Parker Solar Probe (PSP) is a current NASA mission to explore the inner heliosphere in the region between  $\sim 10$  solar radii ( $R_s$ ) and  $\sim 200 R_s$ . Currently, PSP has performed 17 swing by of the Sun and provided invaluable data to date to study the evolution of the solar wind and to test the performance of current global simulation models. With this in mind, we have performed global three-dimensional magnetohydrodynamic (MHD) simulations of the solar wind continuously from October 2018 to December 2022 using our G3DMHD model [Wu et al., Solar Physics, 2020]. The simulation result along the PSP orbit is compared with the in situ PSP data. In general, the best agreement occurs in the solar wind density (yearly cc = 0.68–0.86) and the magnetic field intensity (yearly cc = 0.67–0.82). We found that the magnetic field intensity is clearly underestimated during 2018–2021. We will present the detailed results and discuss some of the disagreements in the comparison.