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The Open Flux Problem: First steps with Solar Orbiter to investigate the underestimation of magnetic flux

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The open flux problem is currently an unsolved mystery, representing a 2-3 factor mismatch between the open flux measured at 1 AU and that via remote sensing of the solar atmosphere and extrapolated to 1 AU. One explanation is that the open flux at the photosphere is underestimated, in particular in the polar regions. Until now it was impossible to test this with observations: the Polarimetric and Helioseismic Imager (PHI) on board Solar Orbiter has made this a reality such that in combination with Earth-based assets, such as SDO/HMI, stereoscopy can be employed.

First numerical simulations of the line-of-sight magnetic field centre-to-limb variation will be presented. This theoretical work suggests that the flux is indeed underestimated at all angles off disc centre, and is enhanced the lower the spatial resolution above $\mu = 0.5$. Finally, preliminary stereoscopic analyses of the observed magnetic flux with both SO/PHI-HRT and SDO/HMI will be shown.

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