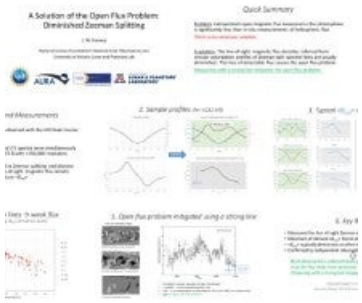
A Diminished Zeeman Splitting Solution of the Open Flux Problem
John
Harvey
National Solar Observatory & Lunar and Planetary Laboratory
N/A
Poster
Heliospheric extrapolations of measured photospheric open magnetic flux typically produce field strengths two to three times smaller than in-situ measurements. There is no consensus solution of this Open Flux Problem. An FTS spectropolarimetric survey of 200 photospheric plage and network spectrum lines observed near disk center strongly supports a likely solution previously suggested by Wang et al (2022). Circularly polarized spectra are surveyed to infer magnetic flux density across line profiles and from line bisectors. In aggregate and with scatter, inferred field strengths vary by factors up to three reaching a survey maximum at line optical thicknesses close to one. Independently observed Zeeman-split plage line profiles from Mt. Wilson and HMI confirm this analysis. Consistent with these results, model-independent comparisons of 1 au heliospheric field strength measurements with flux measured in coronal holes using a strong line formed high in the photosphere show good agreement. It is not yet clear why so much of the magnetic flux becomes undetectable by the Zeeman effect low in the photosphere. A detailed description of these survey results is in preparation.



Poster PDF
harvey1-punch6.pdf
Meeting homepage
PUNCH 6 Science Meeting
Download to PDF