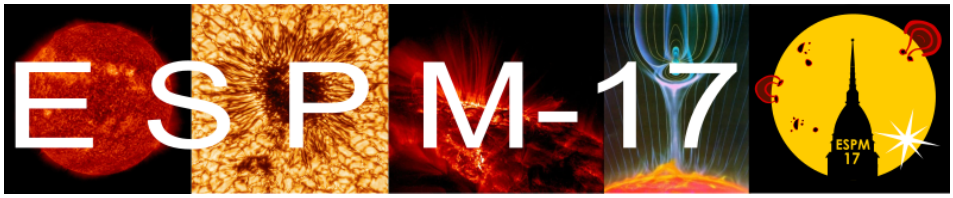

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Observing rapid moss variability in active region cores using Solar Orbiter's EUI and PHI

Active region moss forms at the footpoints of 3–10 MK hot loops. Observations with the High-resolution Coronal Imager (Hi-C) revealed some moss regions exhibiting temporal variability on timescales of 30s. This rapid moss variability is hypothesized to be an indirect evidence for the nanoflare heating model of coronal loops. However, since Hi-C was a sounding rocket mission, the observations lasted only a few minutes. The Extreme Ultraviolet Imager (EUI) on the Solar Orbiter spacecraft now provides coronal observations at higher spatial resolution than Hi-C extending to several hours, that will be crucial to better understand the phenomenon of rapid moss variability. To this end, we used high spatial (image scale $\sim$ 180km/pix) and temporal ($\sim$ 5sec) resolution EUI 174 Å images of an active region moss. We detected frequent occurrence of rapid moss variability near the footpoints of hot loops over the course of 100 min of observations. We also found that at any given time about 1% of the moss area is undergoing the phase of rapid variability. Moreover, based on high-resolution magnetic field maps obtained by the Polarimetric and Helioseismic Imager on board Solar Orbiter, we identified that moss regions overlie different types of magnetic configurations (e.g., unipolar plages, penumbral regions around small sunspots). The magnetic configuration may influence the moss variability. Our observations will help constrain nanoflare based heating models and offer better insights into the processes responsible for mass and energy injection into the hot loops.

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