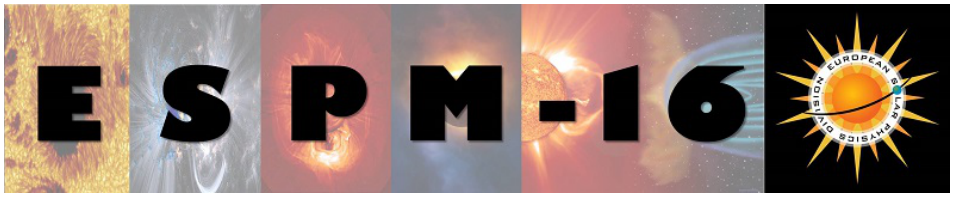

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Are we resolving coronal strands? Analysis of substructure within coronal plasma loop cross-sectional profiles observed by NASA's HiC

Monday 6 September 2021 11:11 (13 minutes)

The High-Resolution Coronal Imager (Hi-C) was launched for a third time on 29th May 2018, resulting in 329 s of 17.2 nm data of target active region AR 12712 with a cadence of approx. 4 s, and a plate scale of 0.129 arcsec^2/pixel.

Co-aligned with SDO/AIA 17.1nm observations, this presentation outlines investigations of the widths of 49 coronal structures. Firstly, evidence of substructure within the loops that is not detected by AIA will be demonstrated. Hi-C 2.1 can resolve individual sub-loop strands as small as approx. 202 km, though the more typical strand widths seen are around 513 km. Strands from a region of low emission that can only be visualized against the contrast of the darker, underlying moss reveal the corona is filled with ubiquitous, low emission, low density magnetic threads.

Secondly, even at these spatial scales there may be evidence for further substructuring within the HiC strands themselves. Width profile intensity variations are reproduced by fitting multiple Gaussian profiles; 183 sub-elements are examined and most frequent structural widths are about 450–575 km with 47% of the strand widths beneath SDO/AIA resolution. These appear to be the result of multiple strands along the integrated line of sight rather than being the consequence of even finer sub-resolution elements.

Finally, the change of strand width along strand length is examined –open fan magnetic strand structures display a width increase from the base while closed structures show little variation. The implications of these results on coronal loop modelling will be discussed.

Student poster?

Author: WALSH, Robert (University of Central Lancashire)

Presenter: WALSH, Robert (University of Central Lancashire)

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