The Relationship Between Solar Surface Magnetic Field and Coronal Soft X-Ray Filter Images

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We investigated the relationship between the photospheric magnetic and coronal soft x-ray flux. The soft x-ray data is from Hinode/XRT (Al-Mesh, Al-Poly, Be-Thin) and MinXSS/X123 cubesat, extreme ultraviolet data is from SDO/AIA (94 angstrom and FeXVIII), and magnetic field data is from SDO/HMI (total B, positive, negative, and unsigned line-of-sight) during June 2016 to April 2017.

SDO/HMI line-of-sight (los) data, at threshold values of 316 and 1000 gauss, and data number per second from each of the Hinode/XRT data filters portray a positive correlation between all data sets shown in time series plots. This indicates that the change in radiation energy is proportional to the change in magnetic flux over time. Currently, Hinode/XRT data displays a stronger correlation to the SDO/HMI los above a 316 gauss threshold than SDO/AIA data from scatter plots. In future work, we will compare these results with MinXSS/X123 data in order to understand the spectral components, temperature structure, and elemental abundance variation with the photospheric magnetic field.

Keywords: Ephemeral Active Region, Solar magnetic fields, Solar X-ray emission

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Acronyms:
Miniature X-ray Solar Spectrometer (MinXSS)
Spectrometer (X123)
X-Ray Telescope (XRT)
Solar Dynamics Observatory (SDO)
Atmospheric Imaging Assembly (AIA)
Helioseismic and Magnetic Imager (HMI)