



Relations between X-ray emissions, magnetic fields and electric currents during the X2.2 flare on the 15 February 2011

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The energy released during solar flares is believed to be stored in non-potential magnetic fields associated with electric currents. The aim of this paper is to study the relation between the location of the X-ray emissions produced by energetic electrons accelerated in the corona, the magnetic fields and the vertical current densities from measurements in the photosphere, during the X2.2 flare on the 15 February 2011 (AR NOAA 11158). We created X-ray images with the data from the *Reuven Ramaty High Energy Solar Spectroscopic Imager* (RHESSI) to overlay them on magnetic field maps and current density maps calculated with the UNNOFIT inversion and Metcalf disambiguation codes from the spectropolarimetric measurements of the *Helioseismic and Magnetic Imager* (HMI) on the *Solar Dynamics Observatory* (SDO). We conclude that the X-rays emitted by thermal and non-thermal electrons during the flare are located above or very close to the photospheric current sheet. A comparison between X-ray and Extreme Ultraviolet (EUV) images from the SDO *Atmospheric Imaging Assembly* (AIA) and a spectral analysis of the X-ray emission complete the study of the flare.