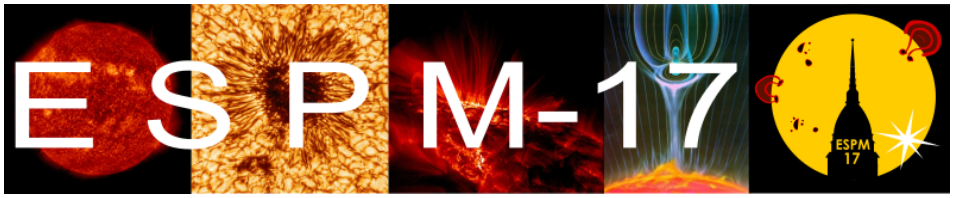

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Chromospheric evaporation as observed by STIX from the perihelion of Solar Orbiter

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During the impulsive phase of the flare, beams of non-thermal electrons move from the magnetic reconnection site towards the chromosphere, where the density increases rapidly. Therefore, we can estimate the plasma density distribution along the non-thermal electrons path directly from the observations of the energy-altitude relation obtained for the HXR footpoint sources. Its shape is determined by changing plasma density, the power-law distribution of non-thermal electrons and a degree of ionisation within footpoints. Previous analysis of the chromospheric density showed power-law dependence. Here, we present a moderate solar flare observed by the Spectrometer Telescope for Imaging X-rays (STIX) onboard the Solar Orbiter (SolO) mission. During the flare, SolO was very close to the Sun (~ 0.32 AU) offering imaging of the solar flare's HXR footpoints with a spatial resolution better than previous HXR telescopes. HXR images were reconstructed with 2-5 keV energy and 10 s time resolutions. The observed relation is not power-law. It reveals details showing the chromospheric evaporation on a wide range of altitudes. We identified two regions within the lower part of the flare legs. Deep in the chromosphere, the moving plasma appeared abruptly with velocities at 300 km/s, while in the loop legs plasma flows look to be more gradual (up to 50 km/s). These details show that the HXR images obtained for the perihelion passage contain new pieces of information about plasma dynamics during the impulsive phase of a solar flare.

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