



Contribution ID: 25

Type: **not specified**

Hard X-ray emission from an unusual flare in the solar chromosphere

Thursday, 8 July 2021 18:35 (50 minutes)

Solar flares, explosions caused by a rapid release of magnetic energy through reconnection, impact the entire solar atmosphere from the photosphere to the corona. While flux ropes and post flare arcades associated with flares are observed at coronal altitudes of several 10 Mm, their footpoints, rooted in the lower atmosphere, are thought to be impacted by energy transported from the site of reconnection that is typically situated in the corona. Flares are rarely observed to be confined to the lower solar atmosphere. Here we present observations of such an unusual compact C-class flare (SOL2013-10-12T00:31) confined to altitudes below the chromospheric canopy. The event is triggered during the merging of opposite-polarity magnetic elements in the photosphere. The event exhibited cusp-shaped flare arcade (a spatial morphological trait that is typical to some major flares), in the ultraviolet (UV) diagnostics, that is largely obscured by the chromospheric canopy. One of its footpoints displayed hard X-ray emission to energies of up to 25 keV as observed with RHESSI. By performing spectral fits to the hard X-ray emission, we found that the flare reached temperatures in excess of 20 MK. Our observations provide a clear evidence for plasma heating to high temperatures from the magnetic energy that is released directly in the lower atmosphere. The implications of such a process in major flares will be discussed.

Email

chitta@mps.mpg.de

Primary author: CHITTA, Lakshmi Pradeep (Max Planck Institute for Solar System Research)

Co-authors: HANNAH, Iain; HUDSON, Hugh; FLETCHER, Lyndsay; PETER, Hardi; YOUNG, Peter

Presenter: CHITTA, Lakshmi Pradeep (Max Planck Institute for Solar System Research)

Session Classification: Working Group 1: Flare thermal response

Track Classification: Working Group 1: Flare thermal response