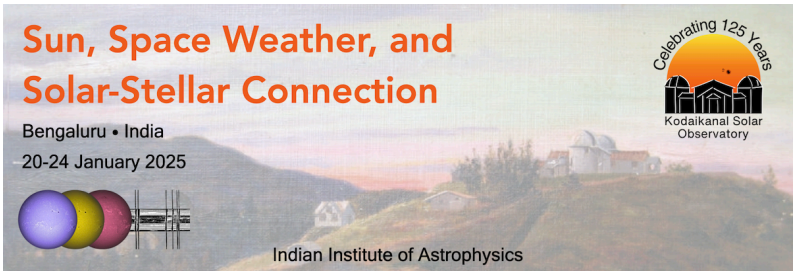

Contribution ID: **70** Type: **Contributed talk**

Campfires and Nanoflares: Signatures of Finest-scale Magnetic Reconnection in Quiet-Sun Corona Observed by Extreme Ultraviolet Imager aboard Solar Orbiter

Wednesday, January 22, 2025 10:15 AM (15 minutes)

The extreme-ultraviolet (EUV) brightenings identified by Solar Orbiter (SolO), commonly known as campfires, are the smallest detected, to date, transient brightenings or bursts observed in the non-active regions of the lower solar corona. Campfires have been proposed to be the finest-scale members of the nanoflare family. Our understanding about the role of campfires in coronal heating stands elusive due to the absence of extensive statistical studies. We perform statistical analysis of the campfires by using the highest possible resolution observations obtained by the Extreme Ultraviolet Imager (EUI) onboard SolO. We use observations in the 17.4 nm passband of the High Resolution EUV Imager (HRIEUV) of EUI obtained during the closest perihelia of SolO in the years of 2022 and 2023. SolO being at a distance 0.29 AU from the Sun, these observations have exceptionally high pixel resolution of 105 km with a fast cadence of 3 seconds. We report the detection of the smallest campfires ever in the quiet-Sun. The detected campfires have sizes of 0.01 Mm^2 to 10 Mm^2. Their lifetimes vary between 3 s and 1000 s. Their distribution of size and lifetime show the power-law behaviour. We find a positive correlation between size, lifetime, and intensity of the campfires. We estimate that about 4000 campfires appear per second on the whole Sun. Considering the HRIEUV bandpass that is most sensitive to the 1 MK plasma, the increasingly high number of campfires at smaller spatial and temporal scales over the quiet-Sun regions supports the nanoflare model of solar coronal heating.

Contribution Type

Theme

Solar Magnetism in High-Resolution

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