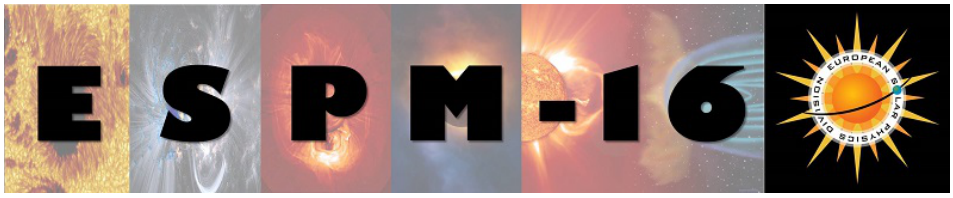

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Propagating localized brightenings in small loop-like structures: Observations from Solar Orbiter/ EUI

Tuesday, 7 September 2021 11:00 (13 minutes)

Localized brightenings observed in extreme-ultraviolet (EUV) images, are generally interpreted as signatures of micro-or nanoflares occurring in the transition region or lower corona. These brightenings are omnipresent and hence, could well play a major role in heating up the solar corona. Recent observations with the Extreme Ultraviolet Imager (EUI) on board Solar Orbiter have revealed such localized brightenings ('campfires') down to an unprecedented size of only of 0.08 Mm^2 (2 EUI pixels). These are the smallest such events yet observed in the quiet-Sun corona. In our study, we find a number of these loop-like brightenings to host propagating features that are manifestations of the internal dynamics. Typically, the propagation speeds range from 30 km/s to 60 km/s. Assuming the loop plasma to be at million Kelvin, these apparent motions would be below the local sound speed, but still quite substantial. Most interestingly, we find non-trivial propagation characteristics, in particular bifurcation, merging, and reflection. These signatures could provide important insights about the dynamic response of the (loop) plasma to the heating events and the location of the heating events themselves. For example, initiation of the brightening on one side of the loop and reflection at the other suggests energization at the footpoint, while an origin of the propagating feature near the apex would be consistent with heating near the top of the bundle of magnetic fieldlines defining the loop. We will discuss these observational results and put them into the context of recent 3D modeling of the small transient brightenings.

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