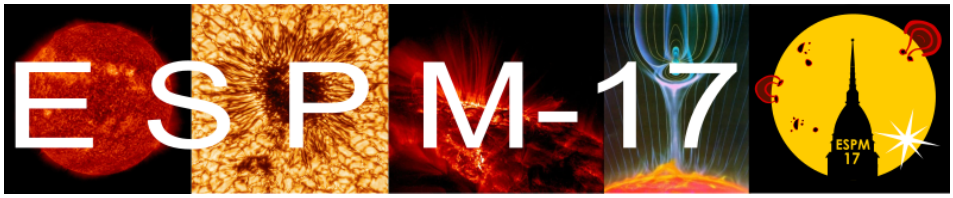

Contribution ID: **128** Type: **Talk**

Nanoflare and nanojets in MHD simulations of magnetic reconnection in coronal loops.

Monday 9 September 2024 15:00 (15 minutes)

Reconnection events in coronal loops are singularly too small and fast to be detected (nanoflares), whereas their collective action could be sufficient to sustain the million degrees corona against thermal conduction and radiative losses. Recent studies have observed and modelled the dynamic counter part of nanoflares, i.e. the nanojets, which are a byproduct of the magnetic reconnection and this avenue seems a viable one to crack the nanoflares enigma. It remains to understand if there is a simple relationship between the properties of the nanoflare and the nanojet, so to explain in which cases the latter, when observed, could give away the occurrence of the former. We will analyse the physics of either phenomena to illustrate the detailed mechanism and key aspects which future studies should pay attention to. Moreover, in order to study the nanoflare population, we need to detect and isolate nanojets even when several take place one after the other. In MHD simulations, a number of detection techniques can be developed in increasingly more complex scenarios from the simple tangling of magnetic field lines to kink instabilities and cascade reconnection. These 3D MHD simulations are key to bridge the gap between idealised magnetic reconnection models and future spectroscopic observations (MUSE) providing key indications on what observations can be planned to export this approach from MHD simulations to observations.

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Session Classification: Fundamental mechanisms of solar plasmas: magnetic reconnection, waves, radiation and particle acceleration

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