

Magnetic Reconnection in Solar and Astrophysical Plasmas

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Abstract

Recent space based observations of the Sun revealed that magnetic reconnection is ubiquitous in the solar atmosphere, ranging from small scale reconnection (observed as nanoflares) to large scale one (observed as long duration flares or giant arcades). Often magnetic reconnection events are associated with mass ejections or jets, which seem to be closely related to multiple plasmoid ejections from fractal current sheet. The bursty radio and hard X-ray emissions from flares also suggest the fractal reconnection and associated particle acceleration. We shall discuss recent observations and theories related to the plasmoid-induced-reconnection and the fractal reconnection in solar flares, and their implication to reconnection physics and particle acceleration. Recent finding of many superflares on solar type stars that has extended the applicability of fractal reconnection model of solar flares to much wider parameter space suitable for stellar flares are also discussed.