

MAGNETIC RECONNECTION AND CORONAL HEATING

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The present review addresses two closely related issues: the process of magnetic reconnection and the mechanism of solar coronal heating. Thus, we will discuss firstly how the Hall effect, which originates from the two-fluid (electrons and ions) description of a plasma, can increase the rate of magnetic reconnection well above the rate predicted by the standard single-fluid MHD, and its possible implications to the solar coronal activity. As far as the coronal heating is concerned, all advances, both observational and theoretical, strongly support the nanoflare heating scenario, when hot coronae of the Sun and other magnetically active stars are formed by numerous small-scale reconnection events. Here we will report recent studies aiming to probe properties of nanoflares by analyzing variability of the coronal X-ray and EUV emission observed with Yohkoh/SXT and TRACE . A future progress envisaged with the Solar-B (Hinode) mission will be also discussed.