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Geometric Scale and Turbulent Features of the CME/Flare Current Sheet

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A long current sheet (CS) is usually developed by the major eruption, it connects the solar flare to the associated coronal mass ejection (CME), and magnetic reconnection taking place through it converts the magnetic energy into heat and the kinetic energy of the bulk of plasma, which account for the flare and the CME, respectively, as well as the kinetic energy of energetic particles. It is believed that reconnection has to occur at a reasonably fast rate in order to drive the eruption as energetically as observed. Traditional theory of reconnection indicates that the CS must be extremely thin so that reconnection could happen fast enough. During the last decade, on the other hand, observations suggested that a CME/flare CS could possess a considerably large thickness. We performed a set of studies and analyses theoretically to show that a CME/flare CS may be highly turbulent, which results in various structures of multiple scales could be thick as turbulence develops inside it, that a turbulent CS could be thick, and those multiple scale structures may help enhance the rate of magnetic reconnection dramatically to the level required for driving the major eruption.