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Chromospheric Reconnection: Observations, Theory and Future Challenges

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Magnetic reconnection is a fundamental process in which the magnetic energy is converted into the kinetic and thermal energy, and drives transient and energetic phenomenon on the Sun such as Jets, Solar Flares and Coronal Mass Ejections (CMEs). After the launch of Yohkoh mission, there have been many observations of magnetic reconnection in the solar corona and the dynamics of magnetic reconnection has been widely studied by means of MHD simulations. However, it is still unclear what determines the fast reconnection rate and bursty behavior of the magnetic reconnection. The solar chromosphere is partially ionized and the collision between ions and neutrals is important. Moreover, it is crucial to understand the coupling between the solar photosphere and corona, so understanding the reconnection dynamics in the solar chromosphere is very important. Recent high-resolution observations from Solar Optical Telescope (SOT) onboard Hinode have shown number of jets in the solar chromosphere. One of the key features in the observations is the presence of tiny, inverted Y-shaped structures called Chromospheric Anemone Jets. So, whether and how fast magnetic reconnection is realized in partially ionized, fully collisional plasma is poorly understood. In this talk, I will review the reconnection scenario in the solar chromosphere in light of the observations and theory.

Keywords: Chromospheric Reconnection, Chromospheric Jets, Hinode