Contribution ID: **52**   Type: **Poster**

The Acceleration of Energetic Electrons by the Reconnection-driven Termination Shock

Wednesday 17 November 2021 09:45 (1 hour)

Solar flares are the most powerful energy release phenomena and important sites for particle acceleration in the solar system. Although many particle acceleration mechanisms have been proposed, it remains controversial which process plays a dominant role and can explain various observational signatures of particle energization. In solar flares, HXR and radio observations provide primary diagnostics of the acceleration and transport of energetic electrons. Nonthermal looptop sources have suggested that particle acceleration takes place above the top of flare loops and the flare termination shock is one of the promising candidates as the acceleration mechanism. Here we investigate the acceleration of energetic electrons in solar flares by combining a large-scale MHD simulation of a solar flare with a particle acceleration and transport model. We find that the accelerated electrons are concentrated in the looptop region due to the acceleration at the termination shock and confinement by the magnetic trap structure, in agreement with HXR and microwave observations. Numerous plasmoids can be produced in the reconnection current sheet and interact dynamically with the shock. We find that the energetic electron population varies rapidly in both time and space due to plasmoid-shock interactions. We also present the first numerical modelling of nonthermal double coronal X-ray sources based on electron acceleration by a pair of termination shocks. Our simulations have strong implications to the interpretation of coronal nonthermal emission sources.

Primary author: KONG, Xiangliang (Shandong University)

Co-authors: GUO, Fan; SHEN, Chengcai; CHEN, Bin; YE, Jing; LI, Xiaocan; YU, Sijie; MUSSET, Sophie; GLE-SENER, Lindsay; PONGKITIWANICHAKUL, Peera; CHEN, Yao; GIACALONE, Joe

Presenter: KONG, Xiangliang (Shandong University)

Session Classification: Day 3 / Session 2