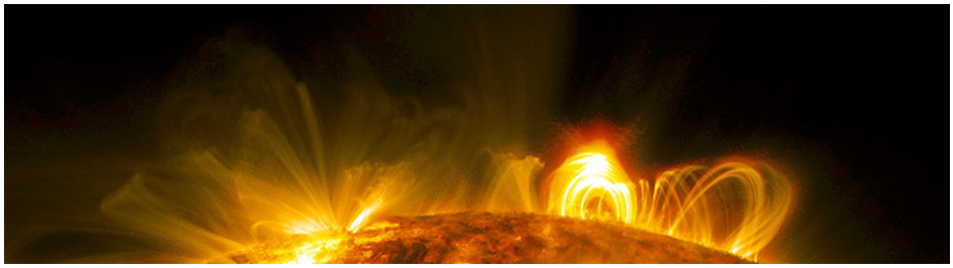

Contribution ID: **53** Type: **Invited talk**

Multiscale Modeling and Simulations of Particle Acceleration in Solar Flares

Thursday, 18 November 2021 11:30 (30 minutes)

We present recent highlights of particle acceleration and transport in solar flares with modeling tools that cover a range of relevant scales. 3D kinetic simulations in the nonrelativistic regime have uncovered the injection process of thermal particles and early stage of nonthermal acceleration of both ions and electrons. The flux-rope kink instability and oblique tearing instabilities lead to a turbulent reconnection region, allowing particles to transport out of flux-ropes and undergo further acceleration. We model large-scale acceleration of electrons by solving a transport model in the MHD simulation of solar flares. Consistent with fully kinetic simulations, electrons are accelerated to hundreds of keV and develop clear nonthermal power-law spectra. The spatially and temporally dependent electron distributions have been used for producing synthetic radio and hard X-ray emission maps, which can be made to closely compare with observations.

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Session Classification: Day 4 / Session 3