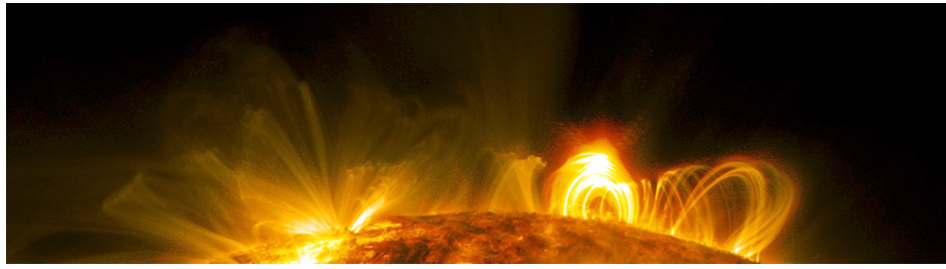


Particle Acceleration in Solar Flares and the Plasma Universe – Deciphering its features under magnetic reconnection



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Type: **Invited talk**

Satellite mission: PhoENiX (Physics of Energetic and Non-thermal plasmas in the X (= magnetic reconnection) region)

Monday 15 November 2021 08:00 (30 minutes)

We are planning a new solar satellite mission, “PhoENiX”, for understanding of particle acceleration during magnetic reconnection. The main observation targets of this mission are solar flares. The scientific objectives of this mission are (1) to identify particle acceleration sites, (2) to investigate temporal evolution of particle acceleration, and (3) to characterize properties of accelerated particles, during solar flares. In order to achieve these science objectives, the PhoENiX satellite will obtain the information about individual X-ray and gamma-ray photons (i.e., position, time, energy and polarization) with three instruments of (1) photon-counting type Soft X-ray focusing Imaging-Spectrometer (SXIS; up to ~10 keV), (2) photon-counting type Hard X-ray focusing Imaging-Spectrometer (HXIS; up to ~30 keV), and (3) Soft Gamma-ray Spectro-Polarimeter (SGSP; spectroscopy is available in the energy range of from > 20 keV to < 600 keV; spectropolarimetry is available from >60 keV to < 600 keV). We plan to realize PhoENiX satellite in the Solar Cycle 26 (in 2030s). We emphasize that, thanks to above new observational approach for solar flares, PhoENiX is the first mission that can survey “accelerating” particles in the magnetic reconnection system. To maximize the scientific outputs from the new observations by PhoENiX, we are also promoting the sounding rocket project FOXSI-4 (that aims to observe a solar flare in 2024) as a demonstration of PhoENiX and developing sophisticated numerical approach and interdisciplinary approach. In this presentation, we will introduce the PhoENiX mission and our trinity (observational, numerical, and interdisciplinary) approaches.

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