Contribution ID: **35** Type: **Contributed talk**

Study of Time Evolution of Thermal and Non-Thermal Emission from the M-Class Solar Flare

Wednesday, 26 May 2021 11:25 (13 minutes)

We conduct the wide-band X-ray spectral analysis in the energy range of 1.5 keV-100 keV and study the time evolution of the thermal and non-thermal emission in the July 23, 2016 M7.6 Class solar flare observed by the Miniature X-ray Solar Spectrometer (MinXSS) CubeSat and the Reuven Ramaty High Energy Solar Spectroscopic Imager (RHESSI). As a result, the time evolution of the non-thermal and multi-thermal components can be obtained with a resolution of 10 seconds cadence, which corresponds to the Alfven time scale in the solar corona and it makes possible to track the detailed spectral phases as the flare progresses. A maximum of three temperature components: a "cool" plasma (T~3 MK), a "hot" plasma (T~15 MK), and a "super-hot" plasma (T~30 MK) have been detected and the emission measure of cool and hot thermal components is drastically increasing more than hundreds of times as the non-thermal emission becomes harder. This detailed time evolution information is a key to estimate each emission mechanism even though MinXSS has no spatial information. By comparing the 17 GHz radiowave flux observed by the Nobeyama Radio Polarimeters (NoRP) satellite and the spatial information obtained by the Atmospheric Imaging Assembly (AIA) onboard the Solar Dynamics Observatory (SDO), we find that a cool and a hot plasma thermal emission are related to chromospheric evaporation and a super-hot thermal emission may come from the thermalization of the non-thermal electrons trapped in the flaring loop.

Primary authors: Mr NAGASAWA, Shunsaku (Department of Physics, The University of Tokyo); Dr KAWATE, Tomoko (National Institute for Fusion Science, Japan); Dr NARUKAGE, Noriyuki (National Astronomical Observatory of Japan); Prof. TAKAHASHI, Tadayuki (Kavli Institute for the Physics and Mathematics of the Universe (Kavli IPMU, WPI), The University of Tokyo); Dr CASPI, Amir (Southwest Research Institute); Dr WOODS, Tom (Laboratory for Atmospheric and Space Physics, University of Colorado)

Presenter: Mr NAGASAWA, Shunsaku (Department of Physics, The University of Tokyo)

Session Classification: Science question 3

Track Classification: Flare and Nanoflare heating