

P02 Time-resolved hard X-ray spectra of the solar flares with the Suzaku HXD-WAM

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“The solar flares are one of the biggest energy-release phenomena driven by magnetic reconnections in the solar atmosphere. The electrons accelerated by magnetic reconnections radiate hard X-ray emissions via non-thermal bremsstrahlung at the flare foot-points and/or loop-top (Masuda et al. 1994). Observationally, the emission appears as power-law spectral shapes, which in turn represents that energy distribution of the accelerated electrons is also power-law type. In addition, Ishikawa et al. (2011) describes that the X-ray peak of a foot-point delays about 10 sec from that of the loop-top emission due to the transit time of the accelerated electrons from the loop-top to the foot-points. However, more careful treatments of the pile-up effect on finer time bins on the analyses are needed to investigate the detailed transfer of the accelerated electrons.

We performed time-resolved spectroscopy of the solar flares observed by the Suzaku HXD-WAM, which is the BGO scintillator surrounding the Suzaku hard X-ray detector and was used as all sky monitor in the 50-5000 keV (Yamaoka et al. 2009). In our analyses, we studied the time evolution of photon indexes and the flux every 1 second, after taking into account pile-up effects using the Geant4-based pile-up simulator (Yasuda et al. 2015). As a result, we found that the peak time of the flux in the high energy band (520-5000 keV) is later than that in the low energy band (50-110 keV). This result supports the picture described in Ishikawa et al. (2011) that the accelerated electrons at the loop-top precipitate into the foot-points after several seconds.

[1] Masuda et al. 1994, Nature, 371, 495

[2] Ishikawa et al. 2011, The Astrophysical Journal, 737, 48

[3] Yamaoka et al. 2009, Publications of the Astronomical Society of Japan, 61, 35

[4] Yasuda et al. 2015, Publications of the Astronomical Society of Japan, 67, 41”

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