

P03 Systematic studies of spectral break-up of solar flares in the hard X-ray band with the Suzaku HXD-WAM

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“The hard X-ray and gamma-ray continuum components in solar flares are considered as Bremsstrahlung emission by accelerated non-thermal electrons. The energy spectra are normally well described by the single power-law shape. However, several authors reported that some flares show hardening spectral shape at higher than 300 keV[1,2]. Such hardening shape is called as spectral “break-up.” Although one of the reasons may be nuclear gamma-ray lines emissions, the break-up is also found in electron-dominated events[2], i.e., flares showing no nuclear gamma-ray lines. Therefore, at least the spectral break-up of electron-dominated flares is caused by intrinsic feature of energy distribution of source electrons[3]. In this presentation, the results of analysis about spectrum break-up using the Suzaku Wide-band All-sky Monitor(WAM)[4] are summarized. The Suzaku WAM is the BGO anti-coincidence shields of the Hard X-ray Detectors (HXD) facing four sides. The WAM is also used for the all sky monitor in the 50 to 5,000 keV band with the large effective area of 400 cm² at 1 MeV per side. Among 756 solar flares detected by WAM, 14 flares are found to have non-single power-law spectra, indicating electron break-up phenomena or contamination of gamma-ray lines. The properties of these flares will be presented.

[1] Share et al. 2003, Astrophysical Journal Letters, 595, L85

[2] Kong et al. 2013, Astrophysical Journal, 774, 140

[3] Li et al. 2013, Astrophysical Journal, 769, 22

[4] Yamaoka et al. 2009, Publications of Astronomical Society of Japan, 61, 35”

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