# Multiple plasmoid ejection and hard X-ray emission

# Hiroyuki Takasaki[1]; Ayumi Asai[2]; Junko Kiyohara[3]; Kazunari Shibata[4]

[1] Astronomy,Science,Kyoto University; [2] Kwasan Obs., Kyoto Univ.; [3] Department of Astronomy,Faculty of Science, Kyoto University; [4] Kazan Astron. Obs., Kyoto Univ.

Recently, magnetic reconnection  reconnection models, like the CSHKP  model (Carmichael 1964; Sturrock 1966; Hirayama 1974; Kopp-Pneuman 1976) are the most commonly quoted as the models which explain solar flares. In this models, the accelerated particles started from reconnection region precipitate into the chromosphere along the magnetic field line and produce hard X-ray(HXR) emission by bremsstrahlung on the chromospheric materials. On the other hands, the coronal plasma materials called soft X-ray(SXR) plasmoid are often ejected in upper direction from reconection region. Generally SXR plasmoid ejections are often observed with soft X-ray telescope(SXT) aboard on Yohkoh satelite. Ohyama & Shibata (1997) reported that plasmoid ejections are strongly accelerated at impulsive phase of solar flare when the hard X-ray is impulsively emitted.

We examine the X2.3 class flare which occurred on 2000 November 24 and found that multiple SXR plasmoids are ejected one after another in this flare. In this research, we analyzed the relation between the tempolral variation of HXR emission observed with Yohkoh/HXT and the ejected timing of SXR plasmoid observed with Yohkoh/SXT and confirmed that each ejected plasmoid is respectively correspond to each bursty component of HXR emission one to one.

This result suggests that the magnetic reconnection occures very nonsteadily in solar flare. Furthermore, our result supports the unified reconnection model of flares which is called the plasmoid-induced-reconnection model (Shibata 1999), which is an extended version of the CSHKP model because the plasmoid ejections play the key role in triggered the magnetic reconnection.