HXT Observations of Solar Flares – A Review and Perspective

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Hard X-rays from solar flares provide wealth of information on high energy electrons produced in flares. Since the beginning of observations in October 1991, the Hard X-ray Telescope (HXT) aboard the *Yohkoh* satellite has revealed, and continues to reveal, various fundamental characteristics of solar flare hard X-ray emission, with unprecedentedly high angular (as high as $\sim$ 5") as well as temporal (0.5 s) resolution. The HXT takes images of solar flares in a wide energy range, in four energy bands (14–23–33–53–93 keV). This implies that, besides imaging hard X-ray sources which are mainly of thermal origin (below, say, 20 keV), the telescope for the first time is capable of imaging purely-non-thermal hard X-ray sources (above $\sim$ 30 keV).

The HXT has revealed that the bulk of hard X-rays above 30 keV from impulsive flares is originated from the footpoints of a flaring magnetic loop, by electrons accelerated near the top of the loop, streaming down towards both ends. On the other hand, the well-known discovery by Masuda of the "above-the-loop-top" impulsive hard X-ray source has clearly demonstrated that magnetic reconnection is a viable process for energy release in flares. The discovery, at the same time, indicated the need for considering flares in conjunction with the evolution of flaring magnetic field structure. The above-mentioned hard X-ray emission from the footpoints contain valuable information for investigating the evolution of the magnetic field structure, in such a way that the motions of the footpoint sources should reflect evolution of particle acceleration site(s), through which we can infer the field structure responsible for flares.

We present a review on hard X-ray imaging observations with *Yohkoh* HXT, with emphasis on their implication to the magnetic field structure and thermal/non-thermal aspects of flares. A perspective of hard X-ray imaging observations will also be given.