

Formation of a transient Trans-equatorial Loop System (TLS) in the solar corona

Masaki Yokoyama[1]; Satoshi Masuda[1]

[1] STEL, Nagoya Univ

Large-scale loop systems (TLS; Trans-equatorial Loop System) which are connected with northern and southern hemisphere active regions of the sun have been observed in soft X-rays. Tsuneta (1996) proposed a model of the TLS formation. He studied a TLS which consisted of two active regions located closely each other, and which had two couples of magnetic loops connected each leading spots and following ones. His model is that magnetic reconnection between the two active regions located in the northern and southern hemisphere results in formation of the TLS. If Tsuneta (1996)'s model works, it is expected that simultaneous energy is input by magnetic reconnection between two active regions. We investigated time variations of the soft X-ray intensity of these two loops, and found that sudden increases of their soft X-ray intensity were asynchronous (we called it transient TLS).

So, we tried to find appropriate events that show a process of the transient TLS formation clearly in Yohkoh/SXT data, and we analyzed the TLS which appeared at west limb of the sun on 27-30 May 1998. This event repeated formation and disappearance a few times during this period, and was one of the most appropriate events for approaching to mechanism of the transient TLS formation. LASCO-C1 observed that a loop structure was lifted and erupted into the interplanetary space from the west limb of the sun, and a new loop structure was formed under the erupted loop structure. Yohkoh/SXT observed a rising hot plasma from the active regions which were located of the TLS foot-points almost at the same time. This means chromospheric evaporation by energy input which is generated in the solar corona. And, temperature analysis of the TLS on 27th showed that the temperature above the center of the TLS is higher than the inner region of that. This temperature distribution compares to the cusp-type flare. Additionally, the configuration of the TLS showed a cusp-shape. These observational results suggest that a cusp-type reconnection plays an important roll for formation of a transient TLS. Finally, we will discuss a new model, which is considered magnetic reconnections between coronal halls and active regions, how magnetic flux was formed strong enough to release such a great energy in the TLS.