

[초IT-03] Solar and Stellar Flares
- from microflares to superflares -

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Recent space observations of the Sun revealed that magnetic reconnection is ubiquitous in the solar atmosphere from small scale to large scale, leading to unified view of various types of solar flares ranging from microflares to long duration event (LDE) flares. We can now understand these apparently different flares and flare-like events with the unified model based on reconnection mechanism (Shibata et al. 1995, 1999). It has also been known that many stars show flares similar to solar flares, and often such stellar flares are much more energetic than solar flares.

The total energy of solar flares is typically $10^{29} - 10^{32}$ erg, whereas that of microflares is $10^{26} - 10^{28}$ erg.

On the other hand, there are much more energetic flares ($10^{33} - 10^{38}$ erg) in stars, especially in young stars.

These are often called superflares. We argue that these superflares on stars can also be understood in a unified way based on the reconnection mechanism (Shibata and Yokoyama 1999, 2002). Finally we show evidence of occurrence of superflares on ordinary solar type stars according to recent stellar observations (Schafer et al. 2000, Maehara et al. 2011).

This implies that there may be a possibility of occurrence of superflares on the Sun. Though the occurrence frequency of superflares may be low, if such superflares occur on our Sun, the Earth and our civilization would be heavily damaged.