

## Will Superflares Occur on Our Sun ?

SHIBATA, Kazunari<sup>1\*</sup>

<sup>1</sup>Kwasan and Hida Observatories, Kyoto University

Superflares are very big flares that release total energy much greater than that of the biggest solar flares ever observed,  $\sim 3 \times 10^{32}$  erg. The famous Carrington flare in 1859 may correspond to the biggest solar flare. If such superflares will occur on our Sun, we would have extreme space weather events, which might lead to big hazards of terrestrial environments and our civilization. Astronomical observations revealed that young stars or fast rotating stars often show superflares ( $10^{34} \sim 10^{38}$  erg). Hence it has been thought that our Sun would have produced superflares when it was young and rotating faster ( $> 10$  km/s). However it was not clear whether superflares would occur on the present Sun or not, since the present Sun is not young and is now slowly rotating (at 2 km/s). Recent observations of solar type stars with Kepler satellite have revealed existence of superflares (with  $10^{34}$ - $10^{35}$  erg) on solar twins which are quite similar to our Sun on surface temperature (5600 K  $\sim$  6000 K) and slow rotation ( $< 10$  km/s). From the statistical analysis of these superflare observations, it is suggested that superflares with energy  $10^{34}$  erg occur once in 500 years and superflares with  $10^{35}$  erg occur once in 5000 years on solar twins and/or our present Sun. Finally, we will also give theoretical arguments whether superflares will occur on the present Sun or not on the basis of modern theories of flares and dynamo.

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