

A13a **Superflares on Sun-like Stars**

Daisaku Nogami, Yuta Notsu, Satoshi Honda, Hiroyuki Maehara, Shota Notsu, Takuya Shibayama, Takashi Nagao, Kazunari Shibata (Kyoto University)

Flares are energetic eruption phenomena observed in our Sun. These can give rise to various kinds of effects on the global environment, and our lives, and are one of the main subjects of the Space Weather.

“Superflares” have 10 to even 10^4 times larger energies than those ever observed in the Sun, and have been recorded in some specific types of stars, such as T Tau stars, RS CVn-type binaries, and dMe stars. Our previous study using the Kepler satellite data, however, has revealed that superflares are seen in some G-type main sequence stars (Maehara et al., 2012, Nature, 485, 478). We then have been investigating the properties of those “superflare stars” with the High Dispersion Spectrograph (HDS) on the SUBARU telescope.

In this project, we found that KIC 11390058 is a Sun-like star showing superflares. The effective temperature, and the surface gravity are listed as being $T_{\text{eff}} = 5,785$ K, and $\log g = 4.3$ in the Kepler Input Catalog. The power spectrum of the Kepler photometric data of this star has the strongest peak at $P = 11.86$ d (the amplitude $\sim 6 \times 10^{-4}$). Our SUBARU/HDS observations on 2012 August 7, and 8, and September 22, and 25 give a slow apparent rotation velocity of $v \sin i = 2.6 \pm 0.3$ km s $^{-1}$, supporting that those photometric modulations are due to the rotation of this star with large spots. No significant radial velocity variations of absorption lines were detected ($\delta V_{\text{rad}} < \text{a few } 100$ m s $^{-1}$). The shallowness of Ca IR triplet, relative to that of the Sun, suggests the strong chromospheric activity of this star. These results imply that the Sun may also give rise to superflares.