

Discovery of Two Sun-like Superflare Stars Rotating as Slow as the Sun

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We report on the results of high dispersion spectroscopy of two ‘superflare stars’, KIC 9766237, and KIC 9944137 with Subaru/HDS. Superflare stars are G-type main sequence stars, but show gigantic flares compared to the Sun, which have been recently discovered in the data obtained with the Kepler spacecraft. Though most of these stars are thought to have a rotation period shorter than 10 days on the basis of photometric variabilities, the two targets of the present paper are estimated to have a rotation period of 21.8 d, and 25.3 d. Our spectroscopic results clarified that these stars have stellar parameters similar to those of the Sun in terms of the effective temperature, surface gravity, and metallicity. The projected rotational velocities derived by us are consistent with the photometric rotation period, indicating a fairly high inclination angle. The average strength of the magnetic field on the surface of these stars are estimated to be 1-20 G, by using the absorption line of Ca II 8542. We could not detect any hint of binary in our spectra, although more data are needed to firmly rule out the presence of an unseen low-mass companion. These results claim that the spectroscopic properties of these superflare stars are very close to those of the Sun, and support the hypothesis that the Sun might cause a superflare.

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