Giant white-light flares on fully convective stars occur at high latitudes

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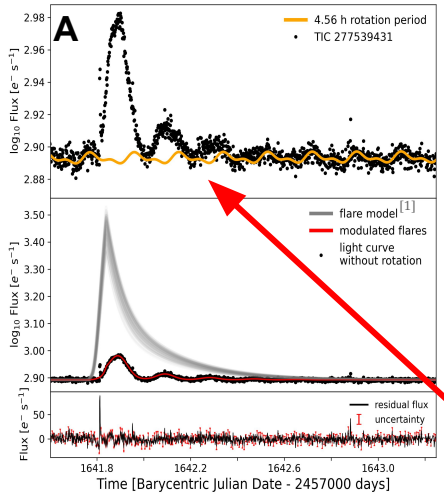
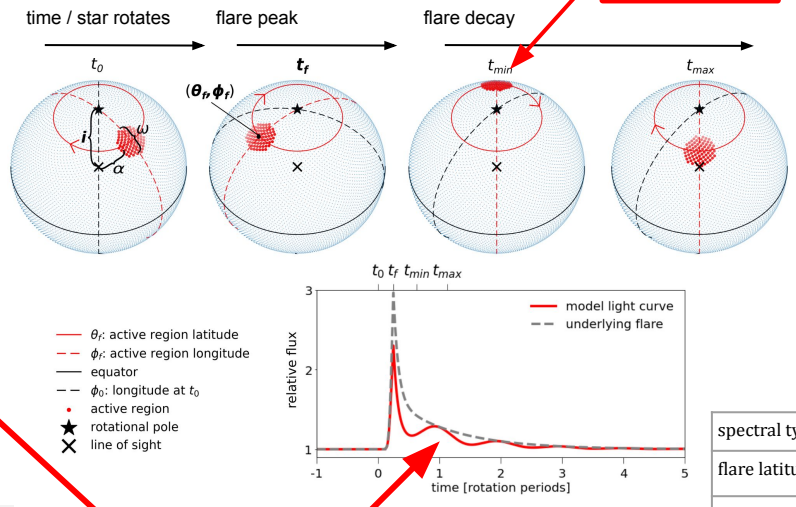
In a **systematic analysis of fully convective stars observed with TESS**, we detected four stars that displayed giant **flares that were modulated in brightness by the stars' rapid rotation**. The morphology of the modulation allowed us to directly **localize these flares between 55° and 81° latitude on the stellar surface**, far higher than typical solar flare latitudes.

These findings are **a.** evidence that strong magnetic fields tend to emerge close to the stellar rotational poles for fully convective stars, and **b.** suggest that the impact of flares on the habitability of exoplanets around small stars could be weaker than previously thought.

data :: TESS light curves



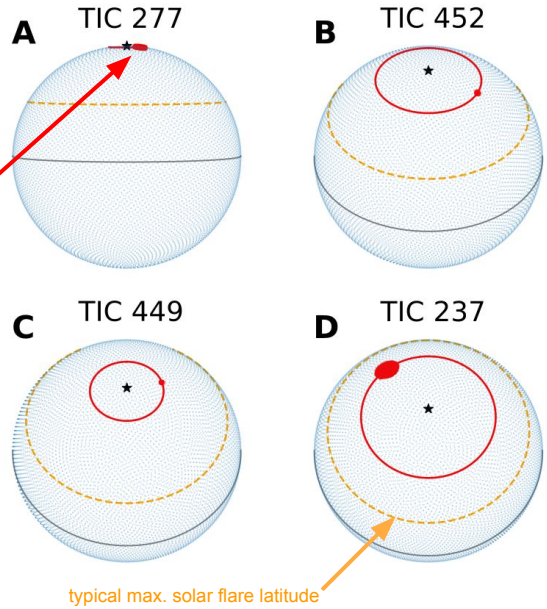
model :: rotational flare modulation



active region

The flare flux is modulated while the active flaring region (partially) moves in and out of view on the stellar surface.

results :: high latitudes



	A	B	C	D
spectral type	M7	M7	M6	M5
flare latitude [deg]	**80.9 ± 0.5**	**63.1 ± 3.6**	**71.9 ± 1.1**	**55.2 ± 5.5**
rotation period [h]	4.56	4.22	2.71	8.43
log(flare energy) [erg]	34.5	33.5	33.4	34.6

[1] Davenport et al. (2014), ApJ, 797, 122

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