Activity of TRAPPIST-1 analogue stars observed with TESS

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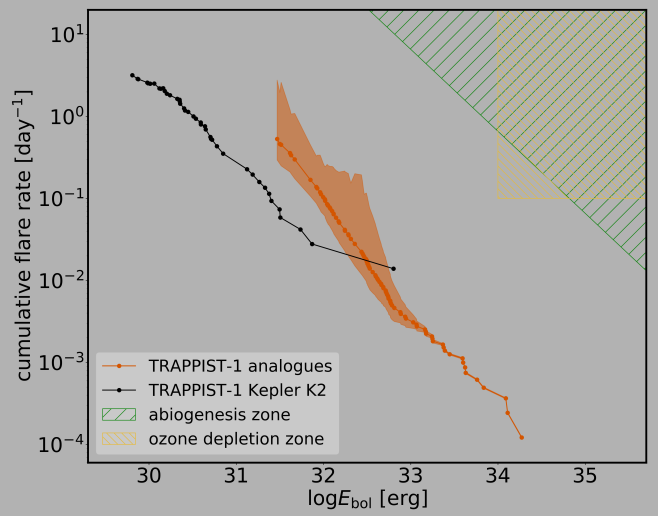
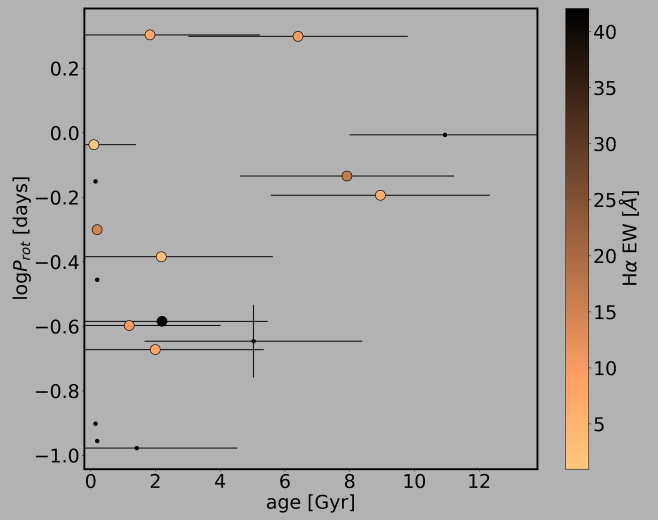
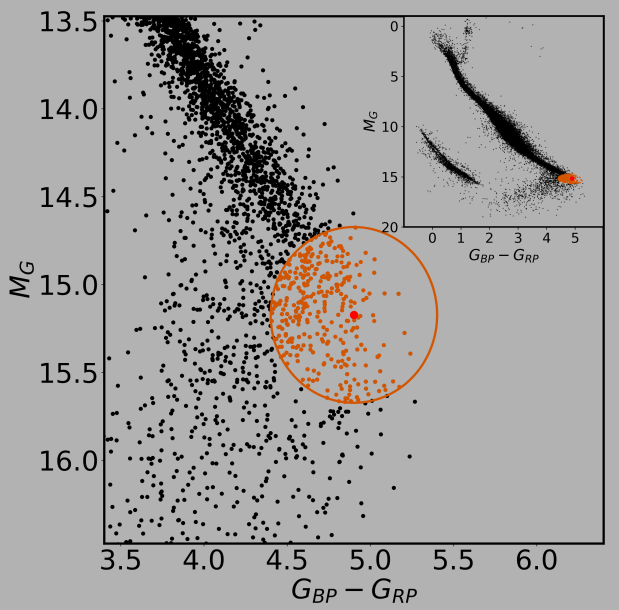
We used TESS full-frame image photometry to study ultracool dwarfs similar to TRAPPIST-1. Out of the 248 objects observed up to Sector 26, we have found 42 fast rotators with periods shorter than 5 days, and 21 flaring stars. The ages of 88 stars were estimated using different methods (galactic kinematics[1], moving group membership[2], comoving pairs). The composite flare frequency distribution shows a power-law index similar to TRAPPIST-1, and it is extended to an order of magnitude higher energies.



Composite flare frequency distribution, after correcting for recovery rate. The average flare rate seems to be insufficient to fully destroy the ozone layer of orbiting exoplanets, but also not enough to initiate abiogenesis.[3,4,5]



No strong correlation was found between rotational period and age, probably due to the large uncertainties.



The sample includes stars within 0.5^m radius of TRAPPIST-1 on the Gaia DR2 color-magnitude diagram, up to 50 pc.

References
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[3] K. Vida et al. (2017), ApJ, 841, 124
[4] P. B. Rimmer et al. (2018), SciA, 4, 3302
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