

TCP J18224935-2408280 is an outburst of a symbiotic star

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The transient TCP J18224935-2408280 was discovered by Tadashi Kojima ([CBAT "Transient Object Followup Reports"](#)). Possible symbiotic nature was later suggested by Patrick Schmeer as he noticed that there is a Gaia DR2 LPV with a reported period of roughly 800 days² away from the announced position (Gaia DR2 4089297564356878720). The star is also included in the catalog of large-amplitude variables of Mowlavi et al. (2021, A&A 648, A44).

The [light curve of TCP J18224935-2408280 from the ASAS-SN survey](#) (Shappee et al., 2014, ApJ 788, 48; Kochanek et al., 2017, PASP, 129, 104502) shows 2.2 mag brightening which started between May 13, 2021 (JD 2 459 348.4) and May 16, 2021 (JD 2 459 351.4). The brightness reached the first maximum in about 5 days followed by a 10-day-long slight decrease of brightness by 0.5 mag. Since the beginning of June, the brightness is gradually rising again. No other brightenings are seen in the ASAS-SN light curve since March 14, 2016 (JD 2 457 461.8).

We obtained [an optical spectrum of TCP J18224935-2408280](#) on June 9, 2021 (JD 2 459 374.7) using an Alpy600 spectrograph mounted at a remotely controlled 35-cm Ritchey-Chretien telescope located in Chile. The spectrum shows strong emission lines of H I, He I, [O III], and He II in addition to the K5-M0 continuum. The measured equivalent widths are 114, 30, 12, and 19 Ang for H alpha, H beta, H gamma, and He II 4686 emission lines, respectively.

The map of Schlafly & Finkbeiner (2011, ApJ 737, 103) gives total galactic extinction in the direction of TCP J18224935-2408280 $E(B-V) = 0.55$ corresponding to visual extinction of $A_V = 1.71$ mag. The parallax of the object in Gaia DR3 (Gaia Collaboration, 2021, A&A, 649, A1) is unreliable (0.0571 +/- 0.0242 mas). Bailer-Jones et al. (2021, AJ, 161, 147) obtained a distance of around 8 kpc for the source. At such a distance, the apparent magnitude of TCP J18224935-2408280 is roughly consistent with class III stars.

Together with the ongoing outburst of the object and the long-term variability, these results very strongly indicate the symbiotic nature of TCP J18224935-2408280. The infrared colors of the object are consistent with an S-type symbiotic star.

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