

New members of the Lupus I cloud based on Gaia astrometry * Physical and accretion properties from X-Shooter spectra

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Context

Based on Gaia DR2, we selected the candidate members of Lupus I which share similar kinematic properties and age with those of the confirmed members of the Lupus I (see Alcalá's et al. 2020 for the selection criteria details and Fig. 1). We also used the OmegaCAM survey to identify those candidates that exhibited H- α excess and included those in our sample to be observed by VLT/Xshooter spectrograph (covering the wide range of 350-2500 nm).

Analysis

We carried out the spectroscopic analysis of twelve candidate members of Lupus I (four of them identified as H- α emitters with OmegaCAM) obtained by X-Shooter, and measured their physical and accretion properties. We used direct measurements on the spectra and used various isochrones (Baraffe models, Dartmouth models, and MIST – see the references) to this purpose. All of our targets proved to be younger than 11 Myrs, which is younger than the age of the Upper Centaurus Lupus (15 ± 3 Myrs) members that spatially overlap with the Lupus complex (Fig. 2).

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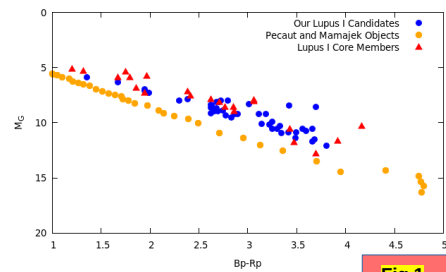


Fig 1

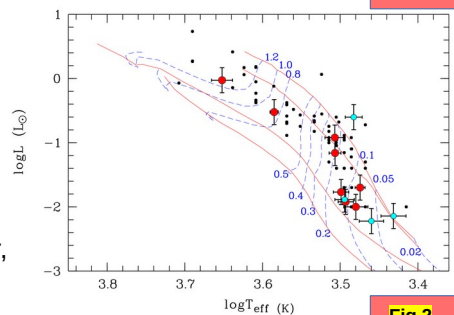


Fig 2

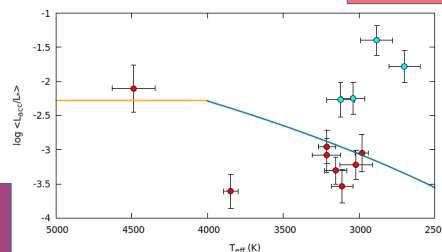


Fig 3

Figure description

Fig 1. color-magnitude diagram of our candidate members of Lupus I (in blue) together with the main sequence stars (in orange) and Lupus I confirmed members (in red). Fig 2. HR diagram of our targets (accretors in cyan and chromospherically dominant targets in red) with Lupus complex members (black dots). The red lines indicate Baraffe et al. 2015 models calculated at ages of 1, 3, 30 Myrs, and 10 Gyrs, from the right to the left. Fig 3. Accretors (in cyan) and chromospherically dominant objects (in red) of our sample, with the limits separating the two regimes (Manara et al. 2017b).

Results

We confirmed that ten out of our twelve candidate members of Lupus I. For different reasons, we could not confirm the membership of two of our targets in the Lupus I cloud, but it is a possibility that all our targets are members of Lupus I. We identified four new accretors in our sample of twelve objects (Fig. 3), and surprisingly, two of them are off-cloud objects. This might hint at diffused populations around the main filaments of Lupus I, as first suggested by Comerón (2008). One of the accretors in our sample is one of the least massive accretors in the entire Lupus complex.

References

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