



HD 108236 system

Comprehensive characterization with *CHEOPS* and *TESS*.
Confirmation of a 5th transiting planet.



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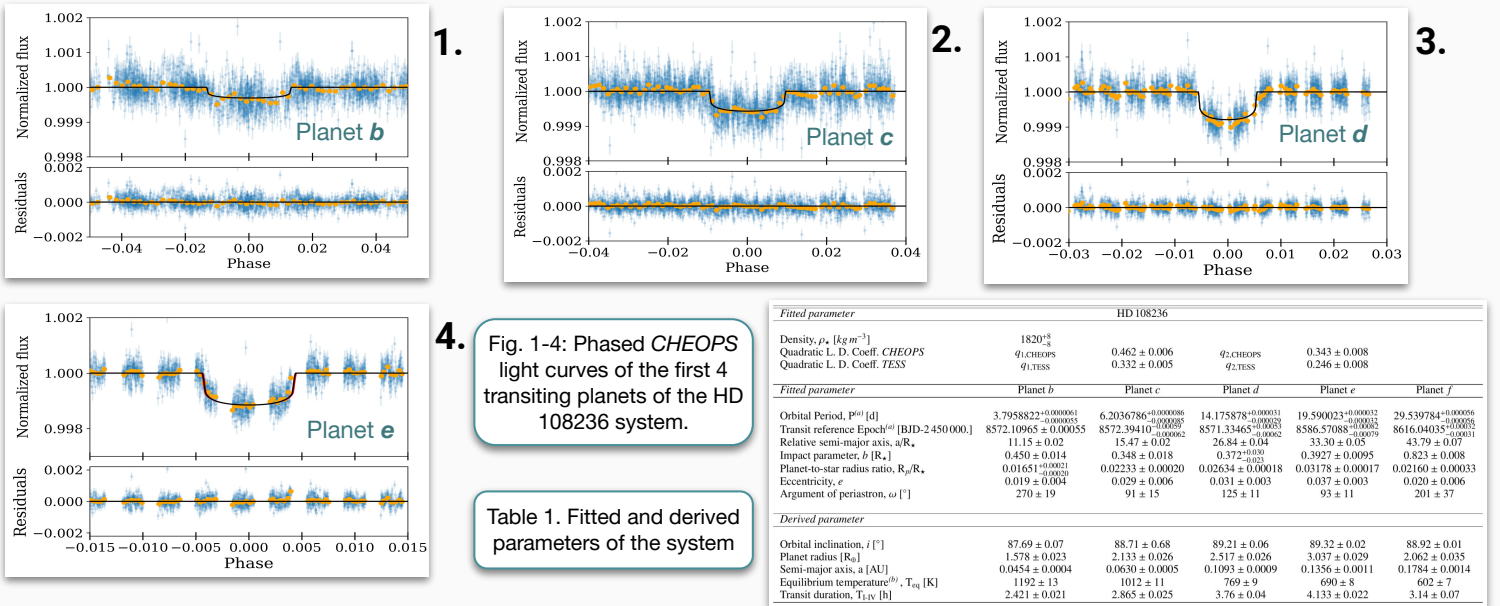
Summary

The HD 108236 planetary system was initially announced as consisting of 4 transiting planets (Daylan+2021). Shortly after, the transit signal of a 5th planet was detected in a *CHEOPS* light curve when observing a transit of planet *b* (Bonfanti+2021). Here, we present the full characterization of the system, using the full *CHEOPS* dataset and *TESS* data. With this, we confirm the presence of the 5th transiting planet with a 29.5 d orbital period. Thus, HD 108236 becomes one of the multi-planetary systems with more than 4 planets orbiting a bright ($V=9.2$) star.

Observations and transits modelling

CHEOPS data: 15 visits (~8.5 d on target) → 16 transits **TESS data:** Sectors 10, 11 & 37 → 43 transits

Analysis: Joint modelling of all the photometric data + updated stellar parameters (based on GAIA eDR3).



Confirmation of planet f

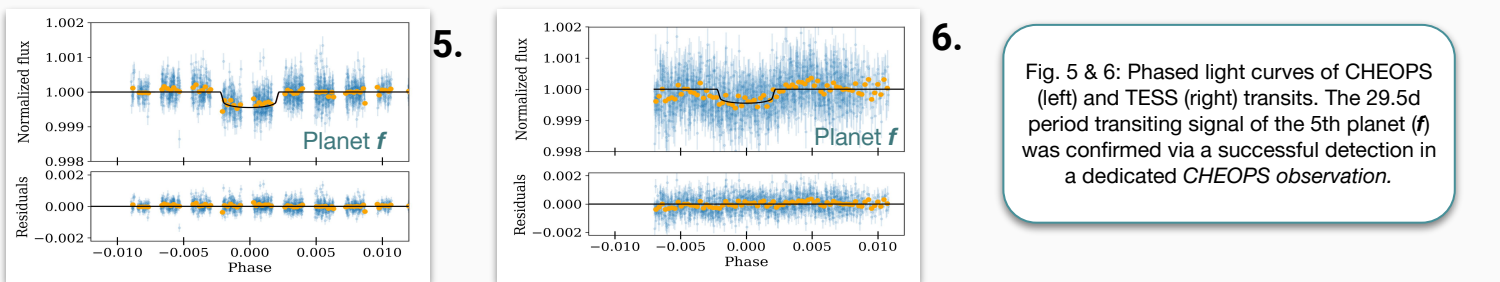
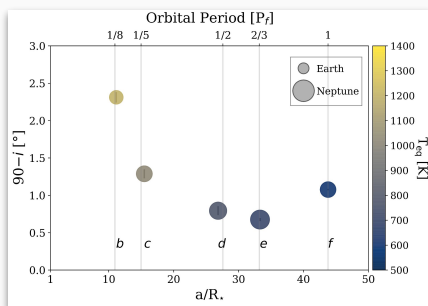
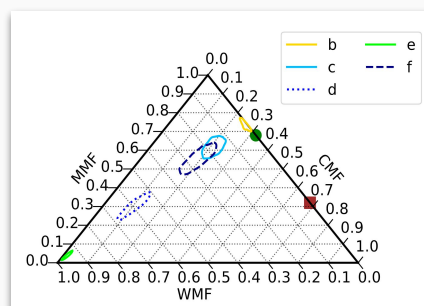


Diagram of the HD108236 system



Internal structure analysis (preliminary)



Planet	CMF	WMF	T_{300} [K]	z_{atm} [km]	A_B
<i>b</i>	0.26 ± 0.02	$0.00^{+0.02}_{-0.00}$	3971 ± 35	748 ± 132	0.21 ± 0.01
<i>c</i>	0.21 ± 0.02	0.17 ± 0.04	3700 ± 66	627 ± 100	0.22 ± 0.01
<i>d</i>	0.10 ± 0.02	0.59 ± 0.07	3302 ± 45	816 ± 159	0.24 ± 0.01
<i>e</i>	$0.01^{+0.02}_{-0.01}$	0.95 ± 0.03	3111 ± 13	723 ± 45	0.26 ± 0.01
<i>f</i>	0.19 ± 0.03	0.25 ± 0.07	2894 ± 58	562 ± 123	0.27 ± 0.01

Fig. 7 & 8. Diagram of the architecture of the HD108236 system and the ternary diagram of the internal structure of the planets (Table 2), based on our precise estimations of the planets sizes and model predictions of their masses.