Witnessing the genesis of exotrojans in **PDS 70**

Olga **Balsalobre-Ruza**, Jorge Lillo-Box & Nuria Huélamo

Centro de Astrobiología (CAB) CSIC-INTA , Madrid, Spain

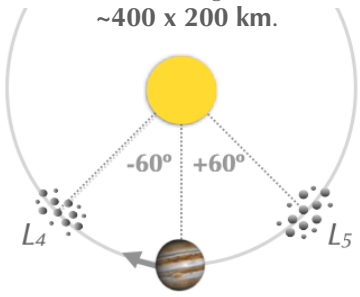
obalsalobre@cab.inta-csic.es

TROJANS ARE

bodies trapped in 1:1 resonance with a planet.

In the tadpole configuration, the pair populates the **Lagrangian regions L_4 and L_5** of each other, which are extended regions **60 degrees** ahead or behind in their orbit.

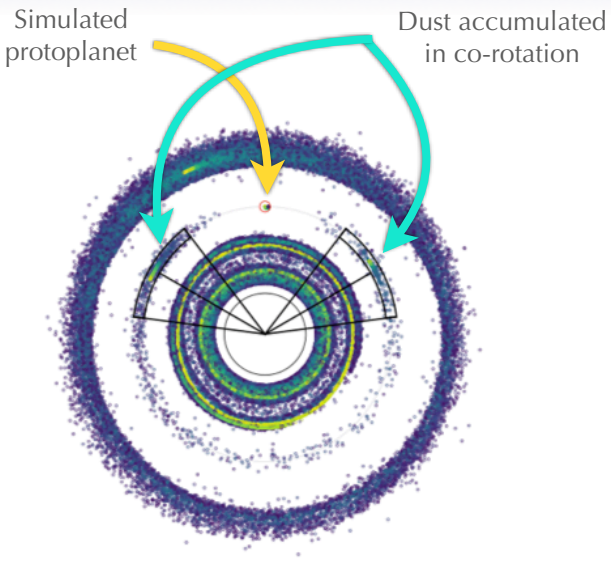
Jupiter harbors thousands of Trojan asteroids. (624) Hektor is the largest with a size of **~400 x 200 km**.



PLANET - PLANET CO-ORBITAL PAIRS

are theoretically possible.

Pairs of co-orbitals with **similar masses** can be stable up to stellar lifetimes (Laughlin & Chambers 2002).



THEIR FORMATION

is a natural by-product according with hydrodynamical simulations.

They can be assembled **from the planetesimals** that accumulate in the L_4 and L_5 regions and can grow to masses up to those of Super Earths (e.g., Montesinos et al. 2020; Lyra et al. 2009).

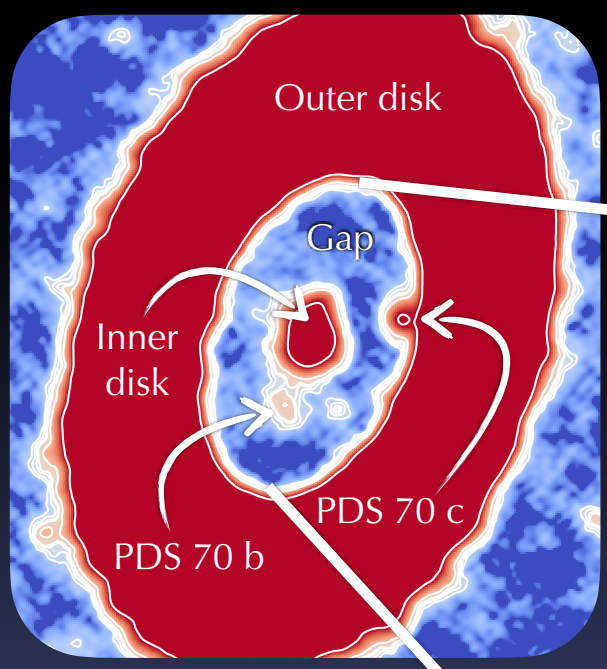
PROTOPLANETS

PDS 70 harbors the only two confirmed planets that are still forming PDS 70 b & c (Keppler et al. 2018; Haffert et al. 2019).

EXOMOONS

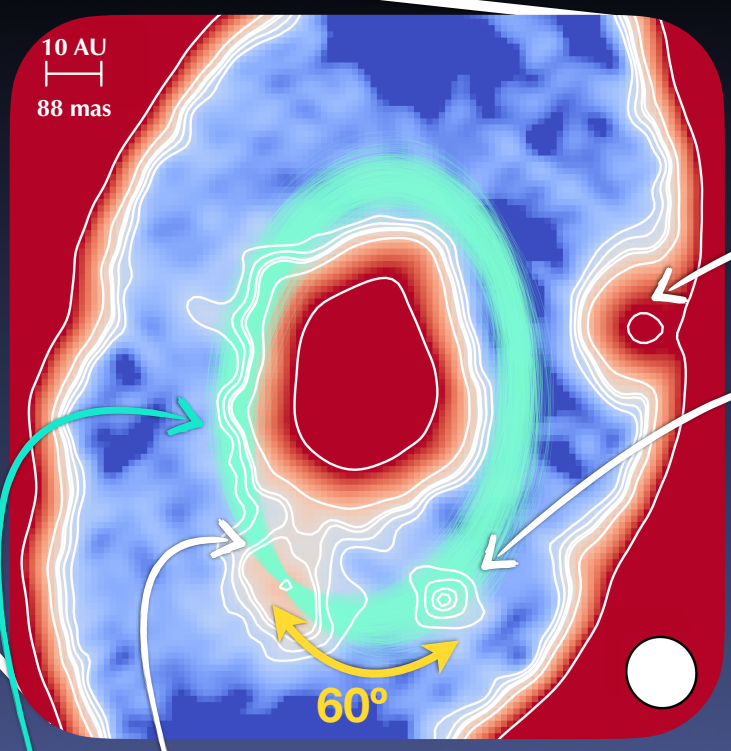
PDS 70 c is surrounded by the only circumplanetary disk (CPD) ever detected, site where moons might form.

PDS 70 with ALMA Band 7 Continuum



The inner disk surrounds the host star, a ~5 Myr old T-Taury type.

The disk shows a wide dust gap presumably sculpted by the protoplanets.



Here, it is located PDS 70 b according with the infrared data.

These are 10^3 random orbits of PDS 70 b as characterized with VLTI/GRAVITY (Wang et al. 2021).

EXOTROJANS

We have tentatively detected **dust accumulated** within the **orbital path of PDS 70 b** and falling in its **L_5 region**. **Are we witnessing the genesis of an exotrojan for the first time?**

This is the CPD of PDS 70 c (Benisty et al. 2021).

Accumulation of dust detected at 6-σ potentially trapped within the L_5 region of PDS 70 b. The co-orbital nature will be tested by checking its motion with future observations (Balsalobre-Ruza et al. 2023, A&A, in press).