IAA

SCIENCE

VLA and ALMA observe hundreds of jets and planet-forming disks around very young protostars in the Orion Molecular Cloud. ALMA sees the outer disk structure (visualized in blue) , and the VLA observes the inner disk and the jet (orange) (Tobin et al. 2020, Karnath et al. 2020).

STAR AND PLANET FORMATION

RADIO INTERFEROMETRIC OBSERVATIONS AND MODELLING OF THE EARLY STAGES OF STAR AND PLANET FORMATION

- Infalling molecular envelopes, dusty circumstellar discs, and ionized radio jets in young stars.

- Debris disks as tracers of the architecture of exoplanetary systems.

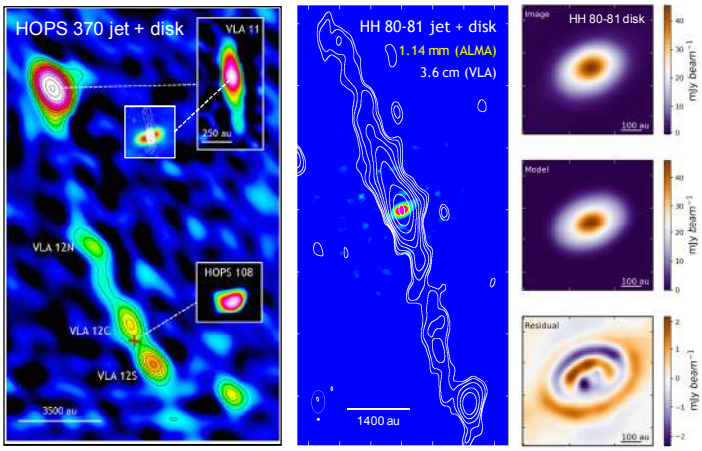
JETS AND ACCRETION DISKS IN YOUNG STARS. Some recent results.

-How newborn stars prepare for the birth of planets (Tobin et al. 2020, Karnath et al. 2020, in press)

- Triggered star-formation by a non thermal radio jet in Orion (Osorio et al. 2017, ApJ 840,36)

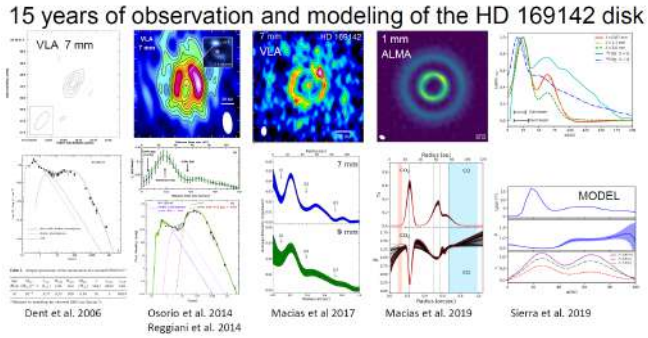
- A comprehensive review of the properties of radio jets from young stars (Anglada et al. 2018, A&ARev, 26, 3)

- First physically self-consistent modeling of a true accretion disk around a massive protostar (Añéz-López et al. 2020, ApJ 888,41)



(Left) The intermediate-mass protostar HOPS 370 drives a powerful radio jet with a thermal (free-free) core and a non-thermal (synchrotron) lobe (VLA 12) that may be triggering the formation of HOPS 108 protostar (Osorio et al. 2017). (Middle) The high-mass protostar driving the long HH80-81 radio jet and its associated circumstellar disk. (Right) Modeling of the accretion disk to infer the disk's radial and vertical structure (Añez et al. 2020).

TRANSITIONAL DISKS



Transitional disks are protoplanetary disks with central cavities and annular gaps that are attributed to the presence of still-forming planets . The disk around the star HD 169142 was one of the very first transitional disks identified, as a result of our VLA observations at 7 mm and subsequent modeling.

DUST AROUND PROXIMA CENTAURI. A multidepartamental project at the IAA.

We have recently reported evidence for a second planet orbiting Proxima Centauri at 1.5 au from radial velocity data (Damasso et al. 2020, SciA, 6, eaax7467). The search was triggered by our ALMA image (Anglada et al. 2017, ApJ 850,6) that hinted to the presence of a millimeter radio source at the same distance from the star.

ALMA observations of Proxima Centauri suggest the presence of several dust belts orbiting the star and a mm source that might be tracing a planet with Saturn-like dust rings (Anglada et al. 2017). (Left) ALMA images. (Center) Sketch of the proposed components. (Right) Artistic representation of the system (Damasso et al. 2020).