

The Atacama Large Millimetre Array (and PACE)



EUROPEAN ARC

Portuguese ALMA Centre of Expertise

The Atacama Large Millimetre Array



The Atacama Large Millimetre Array



The Atacama Large Millimetre Array



A revolutionary research facility:

- ★ 54x12m + 12x7m antennas; 16km maximum baselines
- ★ working over the 84 - 950 GHz range (300 μm - 3.5 mm)
- ★ max. spacial resolution: 5 mas
- ★ max. velocity resolution: <0.05 km/s

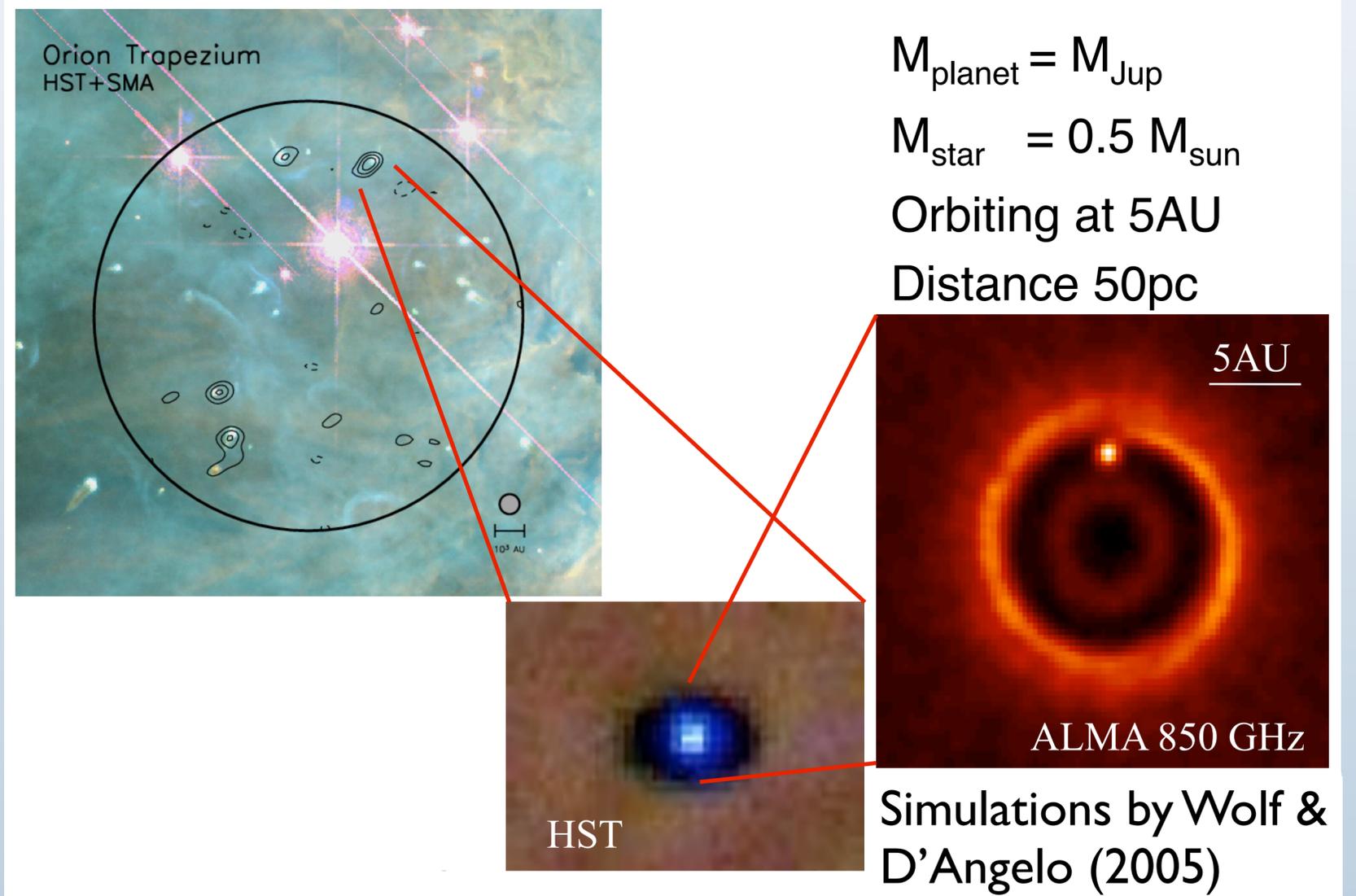
Capable to address most/all astronomy topics

Built and operated by ESO, NA, EA, Chile

The Atacama Large Millimetre Array



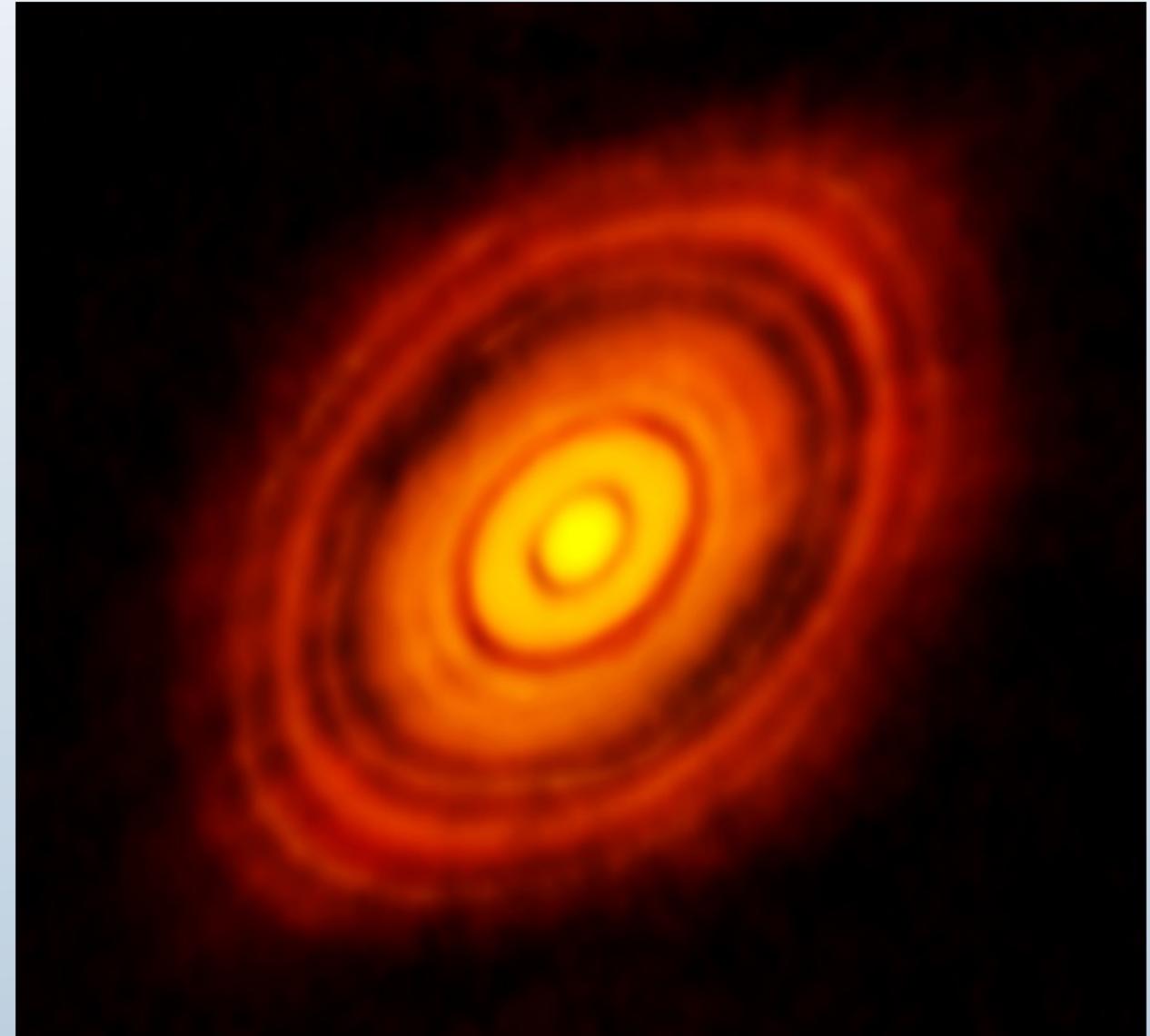
Example: directly image of proto-planets in disks



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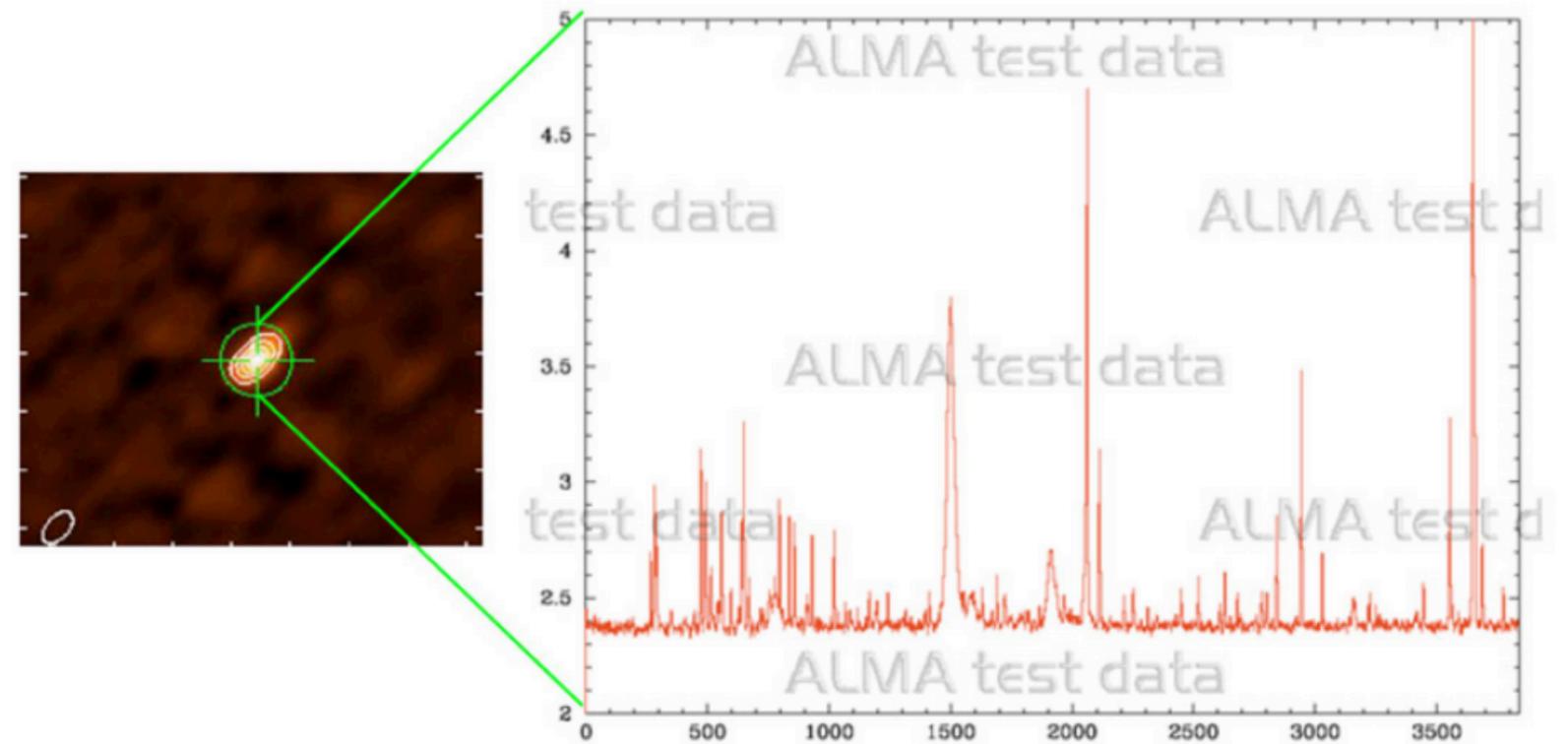
Example: directly image of proto-planets in disks



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Example: Study the chemistry in SF regions

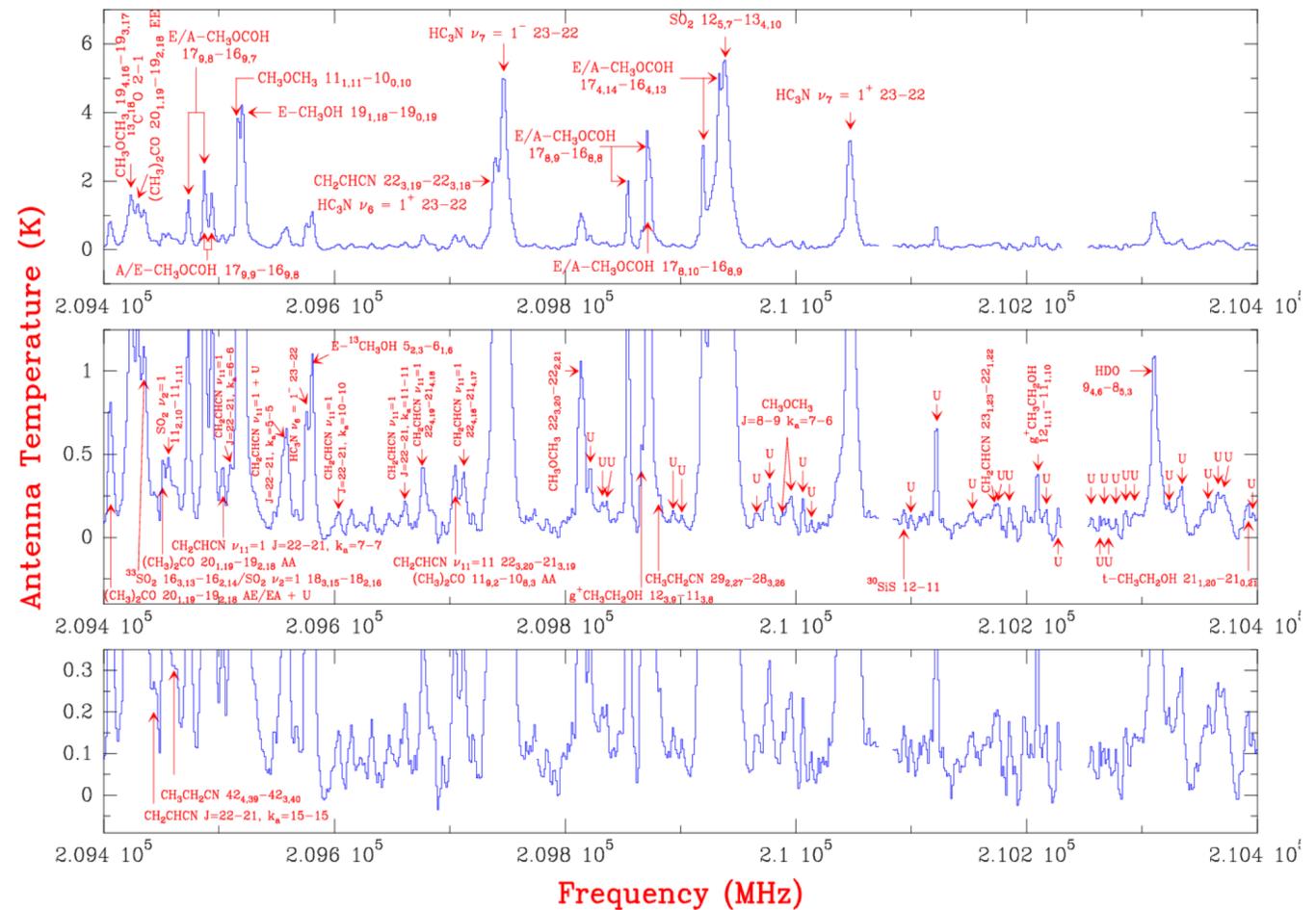


Test 3mm ALMA data for the hot molecular core G34.26+0.15.

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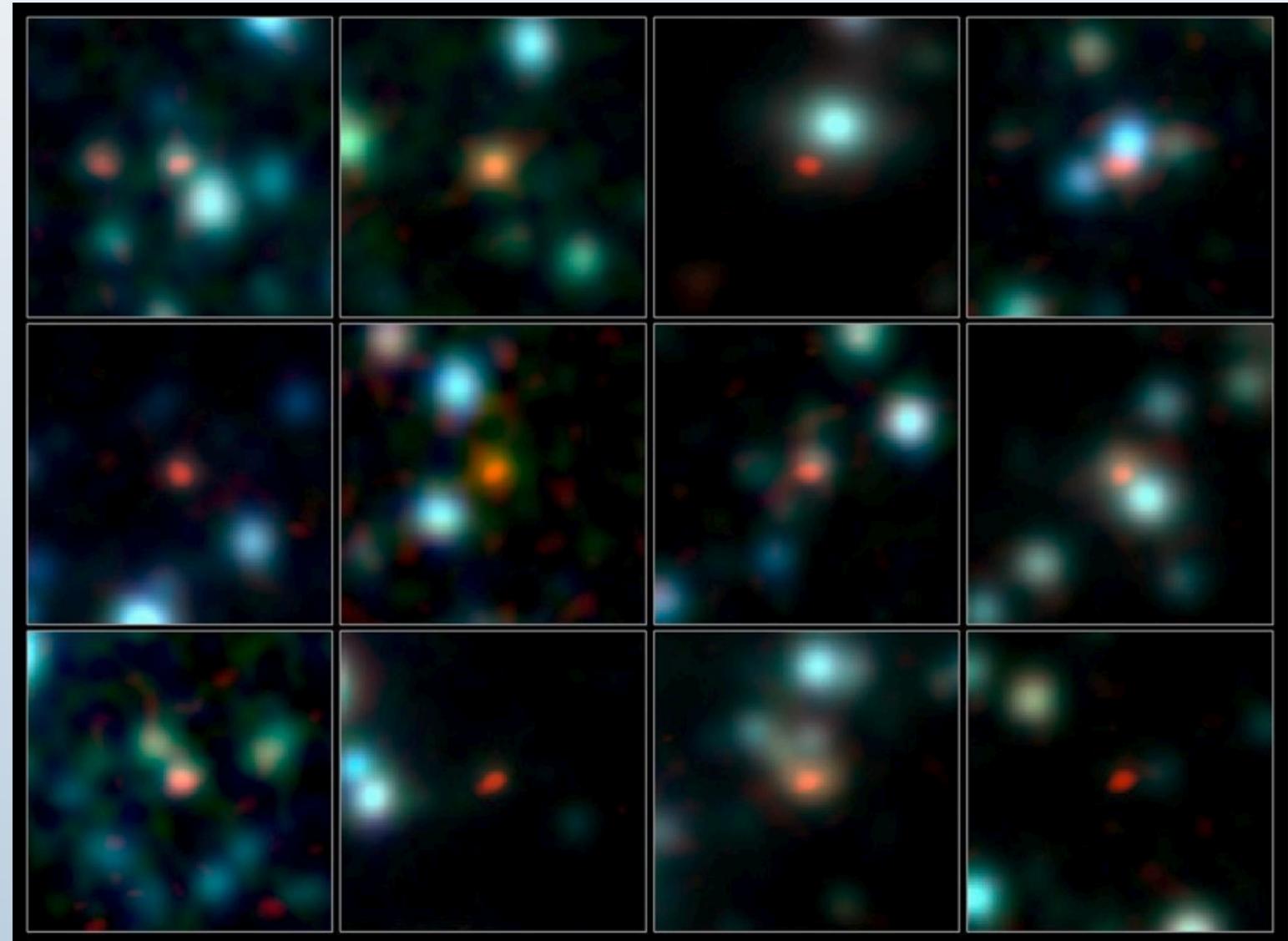
Example: Study the chemistry in SF regions

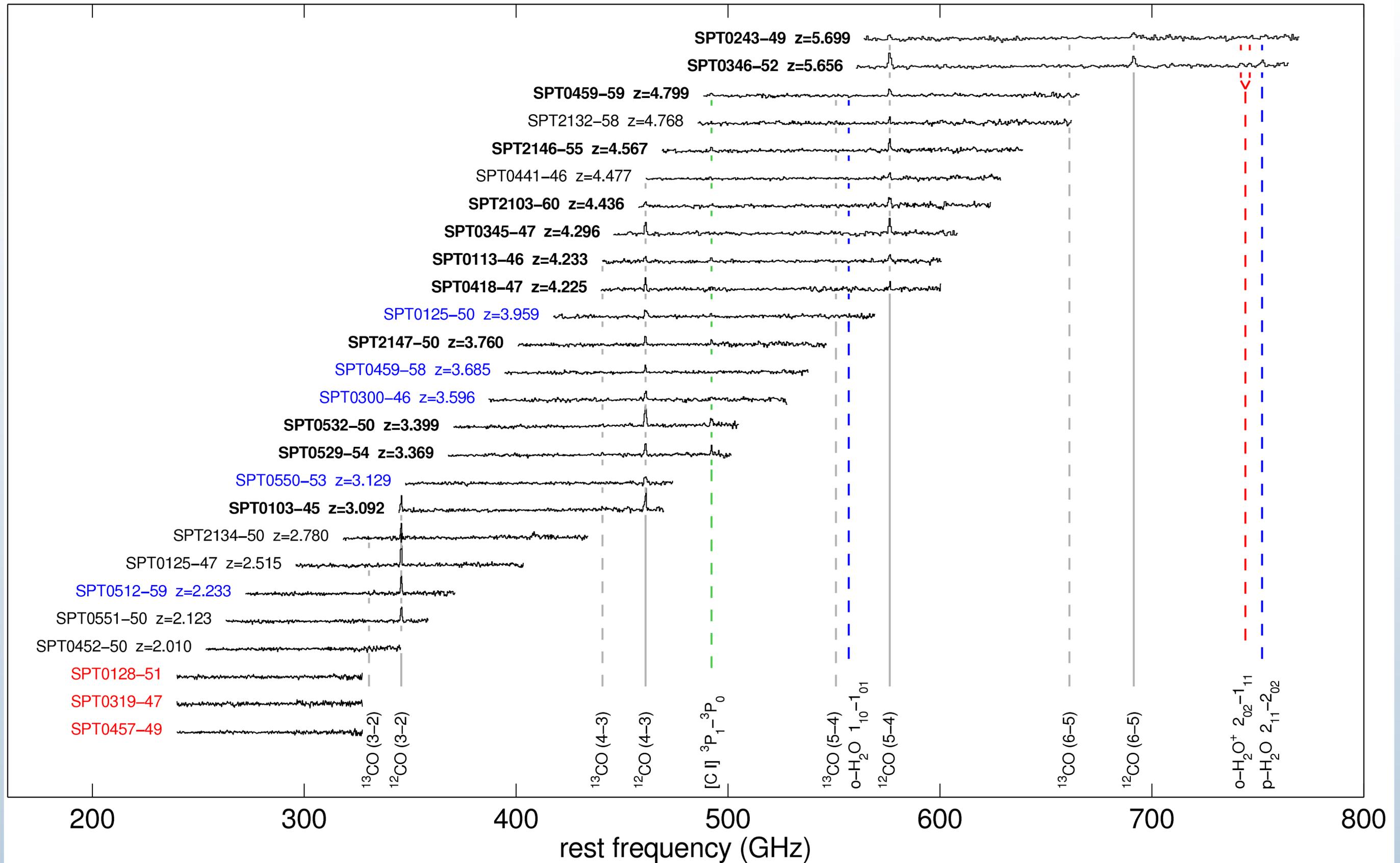


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Example: ... and out to the highest redshifts





ALMA Early Science Cycle 3

Start: Oct 2015 - Sept 2016

Time Availability: 2100 hours

Call: March 24

Deadline: April 23 (est.)

Results: August

Anticipated Capabilities:

- >36x12m antennas + 10x7m antennas + 2x12m total power antennas
- Bands 3, 4, 6, 7, 8, 9, 10 (3mm down to 0.35mm)
- baselines up to 2 km for B8, 9, 10
- baselines up to 5 km for B7
- baselines up to 10 km for B3, 4, 6
- Single field + mosaics
- polarization
- mixed correlator modes

Some non-standard modes:

- Bands 8, 9 & 10 observations
- Long baselines (> 2km)
- Polarization
- Spectral Scans
- All ephemeris observations
- Bands ≥ 7 with all narrow band spectral windows
- Non-standard calibrations

The ALMA Regional Centres



Atacama Large Millimeter/submillimeter Array
In search of our Cosmic Origins



Please select your preferred ALMA Regional Centre (ARC). Alternatively you will be redirected in 11 seconds to the closest ARC which in your case is at



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The ALMA Regional Centres

ARC Duties

- Distribution of Call for Proposals
- user support for proposal preparation
- TAC procedures & technical feasibility
- Assistance with phase II scheduling/execution observations
- Data products support
- Archive operations
- ALMA helpdesk
- community development and outreach

The EU ALMA Regional Centre

- Seven Nodes and one Centre of Expertise
- Duties: user support (face2face proposal preparation and data reduction or archival research, meetings, workshops, Helpdesk); phase II; community preparation; outreach.
- For CoE: also develop unique expertise; increase ALMA national usage



The Portuguese ALMA Centre of Expertise - PACE

PACE main duties

- expertise strengthening (e.g.: planetary atmospheres and data mining)
- ALMA promotion to the national community (national community days, visits to institutions, webpage)
- f2f (proposal preparation and archival research)
- QA2, tutoring in EU-ARC activities
- EU ARC activities (incl.ARC all hands)

The Portuguese ALMA Centre of Expertise - PACE

Cycle-2 PACE supported ALMA programs:

- Spoon et al. “Detecting in CO(1-0) the Strongest Molecular Outflow found by Herschel in the Southern Sky”
- Triester et al. “Caught in a Cosmic Tango: ALMA Spies the Interplay Between Dual AGN in Merger Remnant Galaxies”
- Bauer et al. “Lensing Through Cosmic Time: ALMA Constraints on "Normal" Galaxies in the HST Frontier Fields”
- Ibar et al. “A resolved view to star-forming H- α galaxies at $z = 1.47-2.23$: exploiting the synergy between ALMA and AO-IFU”
- Stott et al. “Probing the $z=1.0$ Kennicutt-Schmidt law by combining ALMA and VLT KMOS observations”

The Portuguese ALMA Centre of Expertise - PACE

ALMA-PT results being produced...

A&A 568, A92 (2014)
DOI: [10.1051/0004-6361/201424410](https://doi.org/10.1051/0004-6361/201424410)
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**Astronomy
&
Astrophysics**

Herschel-ATLAS and ALMA

HATLAS J142935.3-002836, a lensed major merger at redshift 1.027

Hugo Messias^{1,2}, Simon Dye³, Neil Nagar¹, Gustavo Orellana¹, R. Shane Bussmann⁴, Jae Calanog⁵,
Helmut Dannerbauer⁶, Hai Fu⁷, Edo Ibar⁸, Andrew Inohara⁵, R. J. Ivison^{9,10}, Mattia Negrello¹¹,
Dominik A. Riechers^{12,13}, Yun-Kyeong Sheen¹, James E. Aguirre¹⁴, Simon Amber¹⁵, Mark Birkinshaw^{16,17},
Nathan Bourne³, Charles M. Bradford¹⁸, Dave L. Clements¹⁹, Asantha Cooray^{5,12}, Gianfranco De Zotti¹¹,
Ricardo Demarco¹, Loretta Dunne^{20,9}, Stephen Eales²¹, Simone Fleuren²², Julia Kamenetzky²³, Roxana E. Lupu¹⁴,
Steve J. Maddox^{20,9}, Daniel P. Marrone²⁴, Michał J. Michałowski⁹, Eric J. Murphy²⁵, Hien T. Nguyen¹⁸,
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The Portuguese ALMA Centre of Expertise - PACE

Official Site:

<http://pace.oal.ul.pt>



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PACE

Since [May 2014](#), the Centre of Astronomy and Astrophysics of the University of Lisbon ([CAAUL](#)) is officially part of the support structure of the Atacama Large Millimetre Array ([ALMA](#)) support structure as a Centre of Expertise (CoE). This status was granted by ESO after the recognition of CAAUL team's capability to support the community with the use of ALMA, in addition to the already existent [EU ALMA Regional Centre \(ARC\) nodes](#).

The Portuguese ALMA CoE (PACE) is now composed by a [team](#) of nine researchers. CAAUL members are currently involved in seven approved ALMA proposals. The [tasks](#) of the PACE are partly the same as those of an EU ARC node, including, for instance, proposal preparation support.

PACE people

PACE Coordination: José Afonso

PACE Lead Scientist: Hugo Messias

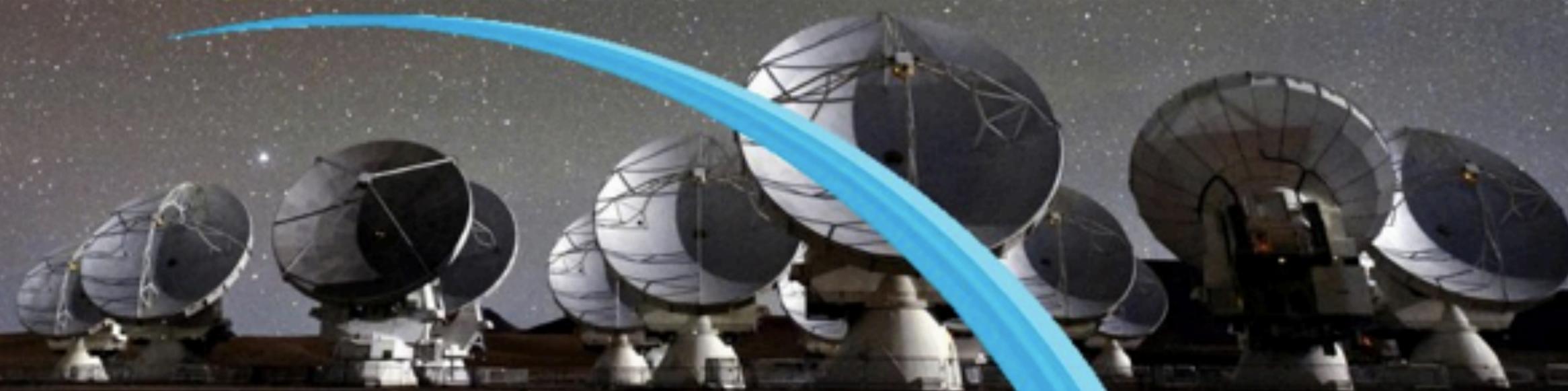
PACE Astronomers: Ciro Pappalardo, Silvio Lorenzoni, Elvira Leonardo, Pedro Machado, David Sobral

Technical Support: Carlos Santos

Administrative Support: Sandra Homem

Outreach: João Retrê

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