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# Ready, Set, Go!

— Gearing up for observations with —  
ALMA Band 1

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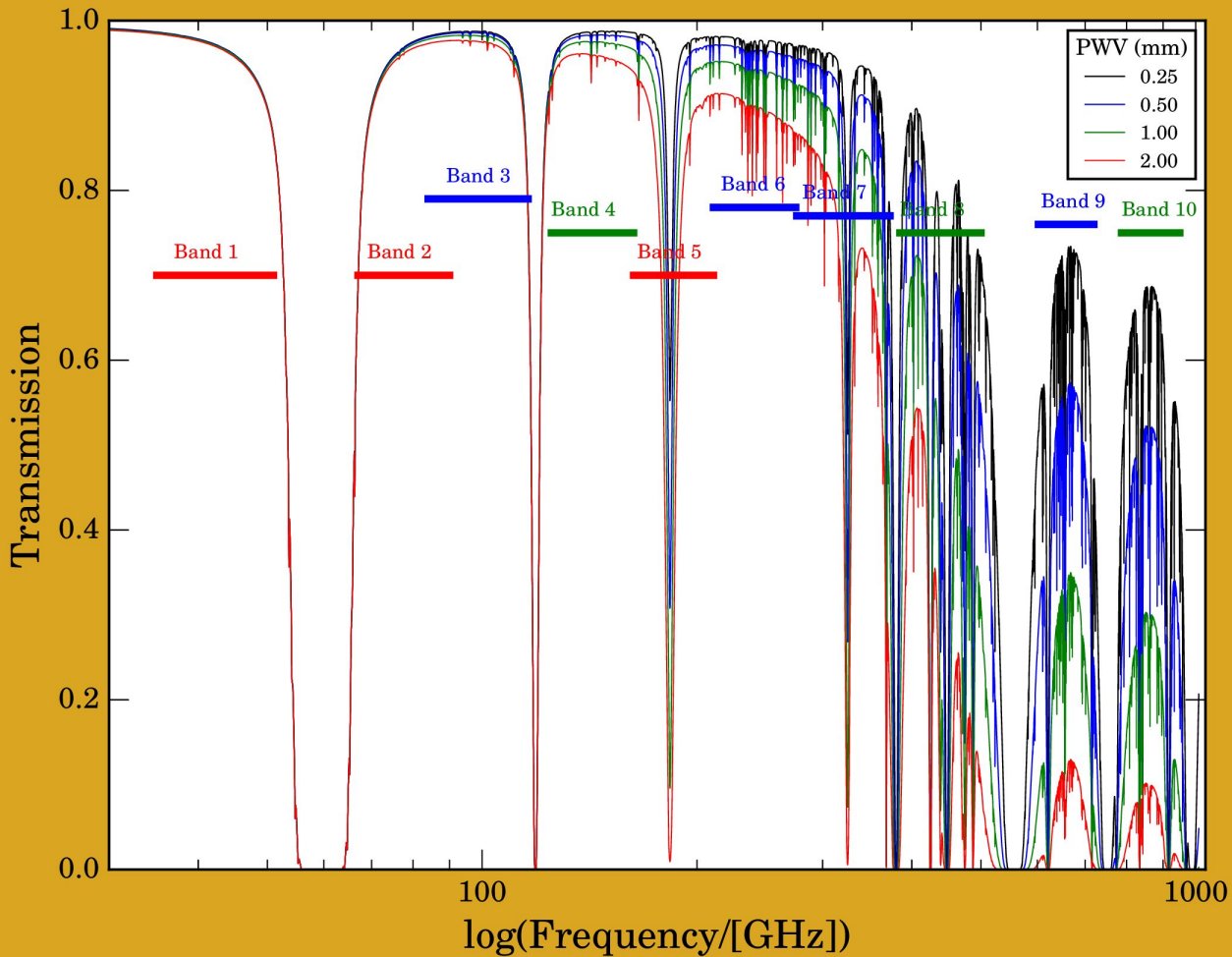
Òscar Morata (ASIAA)

# The ALMA Band 1 receiver

- **Goal:** *access the frequencies ~40 GHz at high resolution and sensitivity from the southern hemisphere*
- Science Case ([arxiv:1310.1604](https://arxiv.org/abs/1310.1604)):
  - Numerous scientific cases: solar studies, **dust around protoplanetary disks**/grain growth, chemical differentiation in starless cores, complex carbon-chain molecules, jets, maser emission, recombination lines, Zeeman effect, polarization, SZ-effect, **molecular gas at high-z**
  - comparison with JVLA
- Frequency range: 35-50 GHz inside specs  
(50-52 GHz best effort)



# Atmospheric transmission at Chajnantor



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# Band 1 contribution to ALMA

- Increase the volume of the observable universe by a factor of 8
- Probe the emission of grains as large as  $\sim 1$  cm (planet formation)
- Very important for study of the bulk of gas in the Universe
- Very high image fidelity and sensitivity will help many scientific cases: SZ effect, protoplanetary disks and debris disks, chemistry, ...
- Bridge the gap between cm and mm radio astronomy (SKA)
- Other possible benefits: VLBI, calibration

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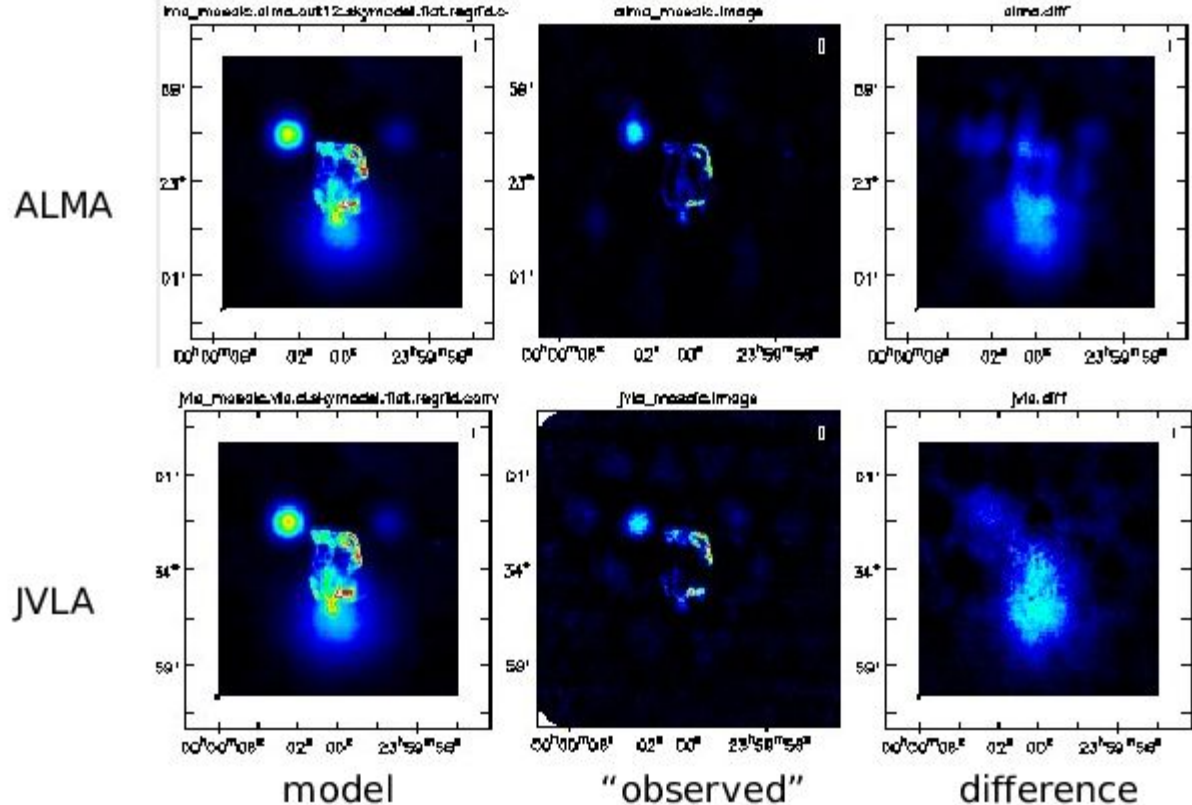
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# Improven

- With current ALMA
  - point sources
  - huge irregularity
- Better atmospheric correction
  - more accurate
  - More irregularity
- Much better resolution
  - More beam

## (Mosaic) Imaging Simulation and Comparison between ALMA and JVLA



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Useful to have other 8 (9) ALMA Bands: CO transition ladder, grains from sub-mm to cm sizes, SZ effect in different bands,...

# Timeline

Currently, 3 cartridges assembled

Projected timeline (finished receivers):

- Jan. 2018: ~25 receivers
- Oct. 2018: ~40 receivers
- Apr. 2019: ~55 receivers
- Dec. 2019: ~73 receivers

*On the antennas ?*



# Timeline: what does that mean for us?

We must do Science Verification before offering the Band

All changes to OT, software (calibration scripts, ...) should be done six months before next ALMA Cycle (september previous year)

It is possible to offer partially Band 1 for Cycle 7 (April 2019), fully Cycle 8

Band 1 SV measurements done by September 2018

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***Next steps?***

# Band 1 Science workshop



image credit: B. Saxton

image credit: ALMA

image credit: Band 1 Consortium

image credit: ESO/C. Malin

[Home](#) [Program](#) [Participants](#) [Venue & Accommodations](#) [ASIAA Website](#)

## ALMA Band 1 Science Workshop

January 16-20, 2017  
ASIAA Auditorium, Taipei, Taiwan

### Program

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**...and prepare the Band 1 Science Verification phase**

# Band 1 Science workshop: Band 1 SV

## Goals of Science Verification:

- Show capabilities of the new ALMA receiver and demonstrate that it meets expected specifications
- Develop and test the calibration and reduction procedures needed to perform the observations

# Band 1 Science workshop: Band 1 SV

What have we done so far?:

# Band 1 Science workshop: Band 1 SV

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- Mailing list ([band1-sv@asiaa.sinica.edu.tw](mailto:band1-sv@asiaa.sinica.edu.tw))
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- Plan for Band 1 SV sessions on Thursday and Friday

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**Now is the time**

