ALMA Status

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Cycle 3

ALMA operates at or close to the proposed capabilities

- 48 antennas available (including 36 on 12m array)
- Band 3, 4, 6, 7, 8, 9, 10 (3mm to 350um)
- High fidelity imaging, mosaicking
- Long baselines
- Flexible correlator (up to 16 narrow spectral windows, or 8 GHz bandwidth)
- Polarization (linear polarization in continuum and spectral line)

2100 hours of observing time

Cycle 4

Increase observing time to 3000 h on 12m array

- increase of 43% from Cycle 3

53 antennas available for PI science

- including >= 40 antennas on 12m array
- compared to 48 antennas in Cycle 3

New opportunities

- 3mm and 1mm VLBI
- Solar observing
- ACA standalone
- Large Programs
  - defined as > 50 hours of 12m or ACA standalone

Steady State Operations

Performance based milestone

- 7300 hours scheduled for science activities annually
  - Successful hours offered ~ 4300 (vs. 3000 h in Cycle 4)
  - ≤970 h for weather and array calibration each
  - ≤320 h for technical issues
  - Testing and further development ~730 hours
- Minimum of 56 antennas in service (daytime)

Goal is steady state by Cycle 5

Challenges

- Weather recovery
- Antenna/receiver uptime (corrective maintenance issues)

Full Operations

Capability Driven Milestone

- 7300 hours scheduled for science activities annually
- Single dish continuum and high frequency
- Polarization: Stokes V and wide fields
- Band 7 maximum baseline length
- Plus all that we are doing already

Goal is full operations by Cycle 7

Upcoming Capabilities: Performance

Cycle 5 targets aimed at steady state operations

- Multi-purpose calibrators
- Reduced reaction time for ToO and time constrained observing
- Faster spectral scans
- Longer baselines at bands 3-6 and 7
- Band 5 available

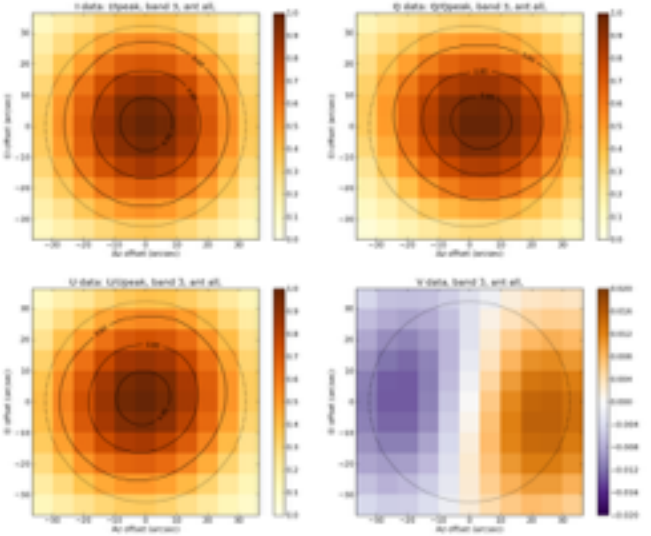
High Frequency Improvements (in addition to dish adjustment)

- Differential calibration for narrow bands and long baselines
- 90-deg switching is a high priority item for Cycle 5

Upcoming Capabilities: Single Dish and Polarization

Cycle 5: efforts are on improving existing modes

- Fast polarization calibration
- Single dish improvements (e.g., better off position use, orthogonal mapping scans)
- Artificial source for polarization characterization



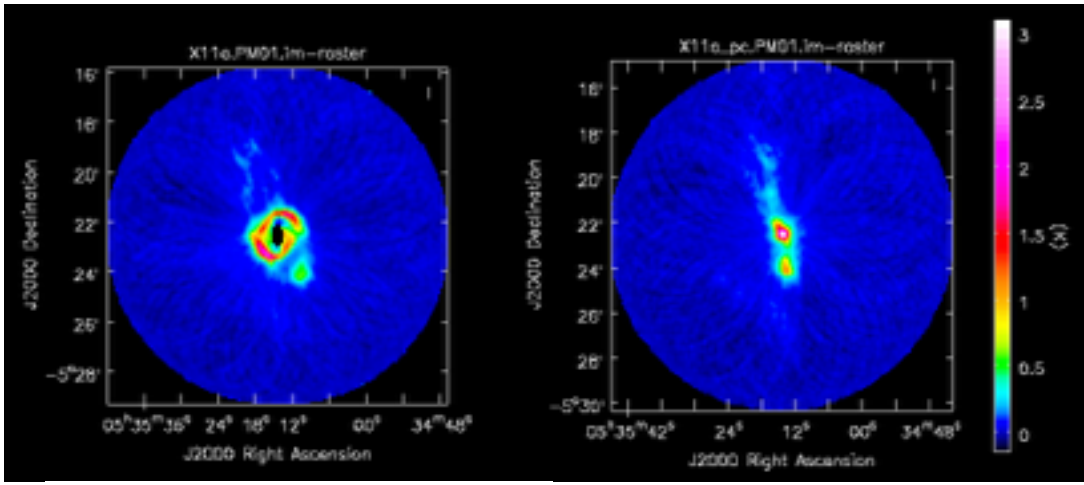
ALMA Polarization Team

Cycle 6

- Continuum single dish
- Zeeman and wide-field polarization

Cycle 7

- Bands 9-10 single dish
- Stokes V
- High frequency polarization



Sawada, Hills, Phillips, Marson

Upcoming Capabilities

Solar
- Higher frequencies
- Fast sampling

Phased ALMA (Cycle 6+)
- Spectral line
- Pulsars

Exotic correlator modes: Cycle 7
- Narrow modes
- Higher bit sampling
- Multi-resolution modes?

Science subarrays and band cycling
- (Near) simultaneous multiple frequencies
- Difficult to schedule subarrays
- Band cycling needs calibration improvements from spectral scans and high frequencies

Combined array