

ALMA Phasing Project (APP)

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New Capabilities: A Beamformed ALMA

- A High Altitude $\sim 85\text{m}$ aperture for all ALMA Bands 1-7.
- VLBI Applications
 - Event Horizon Science: probing strong gravity.
 - AGN: the structure of relativistic jets.
 - Spectral Line: Absorption and Masers
- Pulsars: searches near SgrA* and exotic high frequency varieties.
- A Broad Portfolio of Science Objectives.



Phased ALMA Science: The Community

- Input from community in APP Science Case.
- Over 50 authors.
- 13-member International Editing Team:
 - Keiichi Asada (ASIAA)
 - Avery Broderick (U. Waterloo)
 - Chris Carilli (NRAO)
 - John Conway (Chalmers U.)
 - Heino Falcke (Radboud U)
 - Mareki Honma (NAOJ)
 - Thomas Krichbaum (MPIfR)
 - Robert Laing (ESO)
 - Alan Marscher (Boston U.)
 - Neil Nagar (U. Concepcion, Chile)
 - Dimitrios Psaltis (U. Arizona)
 - Zhiqiang Shen (Shanghai Observatory)
 - Rohta Takahashi (Tomakomai National College of Technology)



APP Schedule

- Sept 2011: NSF/International Funding (4 yrs)
 - \$2.7M (NSF), \$1.3M (Int'l), \$0.5M (ADF).
- Nov 2012: PDR passed (~50 RFA's)
- Nov 2012: ALMA Board approval to CDR.
- May 2013: CDR (Charlottesville)
- Fall 2013: Hardware delivery.
- mid-2014: Software delivery and local tests.
- 2014/2015: VLBI commissioning.



ALMA-VLBI Roadmap

- Four Phase Plan (Mark McKinnon)
 - I: APP Completion (approved).
 - II: Event Horizon Telescope Experiment (EHTE)
 - III: Roadmap for mmVLBI Network (Int'l WG)
 - IV: Implementation of Roadmap.
- Includes rapid access to 3mm (Band 3) VLBI via existing global networks (VLBA, GMVA).
- EHTE to be pathfinder for 1.3/0.8mm VLBI.

