ALMA: Phasing and VLBI

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ALMA Phasing and VLBI

- No H-Maser: use CSO in future?
- Phase noise spec: 1Hz-1kHz is 250fs or 20 degrees at 230GHz.
- ALMA Correlator:
  - 2-4 GHz passband, sampled at 4.000Gs/s
  - 32 channels, each 62.5MHz (clock x125MHz!)
  - hooks exist to sum 64 antennas in each ch.
  - No firmware to make phase and delay corrections to data.f
  - data available in digital form – no analog taps.
- Atmosphere may limit array phasing to central antennas (~10?).
ALMA VLBI Needs/Issues

• Firmware to implement delay/phase corrections to coherently sum antenna data.
• DSP design to combine 32 channels and re-clock to 128MHz.
• …or, record 32 channels separately and leave clock at 125MHz and correct to 128MHz clock in software later.
• Add VLBI formatting (DBE2…)
• Operational Software for VLBI ALMA mode.
• DSP could build on SMA phasing work – support to pursue project.
ATF Participation

- Gives excellent opportunities for amplitude calibration.
- Performance of 230GHz?
- Single polarization.
- Use VLA maser.
- Availability and status of Rx, LO in future?