Current Status of SMA Receiver System

Edward Tong Dec. 2016 SMA Governing Board Meeting Hilo, Hawaii

Status of SMA Receiver System in Dec. 2015

- 240 GHz Receivers partially installed.
- 400 GHz Receivers have not been upgraded.
- SWARM Q1 working at reduced clock rate.
- SWARM Q2 being installed.
- Dual Pol operation with SWARM was not quite ready.
- ASIC Correlator showing signs of aging.

Milestones Reached in 2016

- New 240 GHz Receiver Set in Full Operation.
- SWARM Full Speed Operation achieved in summer.
- SWARM Q2 and Q3 installed and commissioned.
- ASIC correlator retired.
- Nightly Routine Dual Rx Observation.
- Offers Dual Pol Observation with SWARM.
- Participated in EHT 2016 campaign with dual pol receivers @ 32 Gbit/sec
- SWARM Q4 being installed (Dec. 2016).
- Upgrade of wideband 400 GHz Rx almost finished.

IF Bandwidth Increase During 2016



Wide Band Observation Not Available in Other Observatories



Track 11/28/16 S2016A-S008



Increased Sensitivity with SWARM





High-Z Galaxy Track Oct 2016 LO 343 GHz PWV ~ 1 mm Dual 300/400 Rx 3Q SWARM 7 ant. Contours 3, 4, 5 σ: σ ~ 0.5 mJy

- Wider operation bandwidth of the SMA has significantly improved its continuum sensitivity.
- Before SWARM, SMA could achieve σ ~ 1 mJy @ 345 GHz in good weather.
- Once SWARM reaches its full capacity, the SMA is in a position to see fainter continuum sources.
- At 230 GHz, the present SWARM can already reach ~0.25 mJy (*private communication Glen*).

Summary & Outlook

- 2016 has been a banner year for SMA Receiver Development. Multiple milestones have been reached.
- IF bandwidth has been increased and sensitivity has been improved.
- Front-end Receiver Operation is stable. Only minor issues need to be addressed.
- SWARM is starting to fulfill its mission and its reliability has steadily been improved.
- Cryostats are holding up. One spare in Hawaii. Cryostat failure is a concern going forward.
- The Receiver Lab is ready to tackle the wSMA Receiver system.