Fast Switching

- Almost no work since ALMA Memos 403 & 404 came out 18 months ago.
- Fast switching very quickly detects the atmospheric phase on a nearby calibrator, then applies that phase to the target source; cycle time $< \text{atmospheric stab. time}$.
- Advantage: Well defined method to calculate residual phase errors.
- Complication: For SNR & Source Count reasons, we calibrate @ 90 GHz.
  - Basically, must make electronics stable - e multiply electronic phase cal every 15-30 minutes.
  - Must understand sub-mm dispersion.
  - If there are dry fluctuations - will work for mm, won't work for sub-mm (dispersion).
• In our most recent fast switching analysis, we optimized between:
  - Maximizing the time on source to minimize SNR Loss
  - Minimizing the cycle time to minimize decorrelation SNR Loss

• We matched the best phase conditions to the highest Y —
  Note significant sensitivity loss compared to matching the best J conditions
  → WVR's advantage!

• Results in:
  20 s cycle time
  2-3 s slewing & calibrating calibrator — typically 50 mJy,
  < 1 degree

  ~ 10-15% sensitivity loss relative to no fast switching through no atmosphere.

* Decorrelation Correction
* Evaluate Prototype antennas' Fast Switching & Settle Down function