DRMI Status

- Downtime and locking duration have both improved dramatically.
- The downtime has been reduced due to changes in the loop shape and gains, and adjusting the triggering thresholds (alog 14622)
- The increased locking duration (~4 hrs) is probably due to several factors:
  - Better alignment
  - Less PRC clipping
  - Less BS oplev noise
  - ASC loops
- There is still some SRCL mode hopping; however, the frequency of these hops occurring is much less, and it doesn't always cause a lock loss.
- Succeeded in transitioning from 1f to 3f

DRMI Signals

	PRCL	SRCL	MICH
1F Signal	REFLAIR_A_RF9_I	REFLAIR_A_RF45_I & REFLAIR_A_RF9_I *	ASAIR_A_RF45_Q
3F Signal	REFLAIR_B_RF27_I	REFLAIR_B_RF135_I & REFLAIR_B_RF27_I *	REFLAIR_B_RF135_Q
Trigger	POPAIR_B_RF18_I	POPAIR_B_RF18_I	POPAIR_B_RF18_I
Optic	PRM	SRM	BS
UGF 1F	60 Hz	50 Hz	10 Hz
UGF 3F	60 Hz	15 Hz	10 Hz

* This is to decouple PRCL from SRCL.

ALS Status

- ALS COMM and DIFF are robust.

- ALS Guardians are in place.

- Noise spectra are consistent with HIFO-XY days (alog 14324)

- ETM tidal feedback was commissioned, but has not been tested recently and probably needs to be improved (alog 14412)

Arms + DRMI

- ALS COMM and DIFF were locked. IR was set 500 Hz off resonance (on either side), DRMI was locked, but we saw a more significant SRCL mode hopping; this was solved by putting a SRCL offset (alog 14654).

- With a COMM offset of ~120 Hz IR, the DRMI loses lock (alog 14433).

PRC

- PRMI locks stably.
- ASC WFS are commissioned.
- PRC recycling gain was originally measured to be 21 for 45 MHz sideband (alog 14532 , alog 14584).
- Determined there was beam clipping in yaw, possibly due to PR2 baffle (alog 14567, alog 14640, alog 14650)
- Improved the beam clipping, and the PRC recycling gain increased to 25. Still more room for improvement (alog 14611) since the recycling gain should be closer to 40.

ASC

- WFS loops are closed for PRMI ([alog 14615](#))

	PRCL	MICH
Signal	REFL_A_RF9_I	AS_A_RF36_Q
Optic	PRM (M2 stage)	BS (M2 stage)

– Need to measure input sensing matrix

- DRMI ASC loops are also closed

	PRCL	MICH	SRCL
Signal	REFL_A_RF9_I	AS_A_RF36_Q	AS_A_RF36_I
Optic	PRM (M2 stage)	BS (M2 stage)	SRM (M2 stage)

– Need to measure input sensing matrix
– Add feedback to PR2

DC Centering

	REFL_A_DC	REFL_B_DC	AS_A_DC	AS_B_DC
Optic	RM1, RM2*	RM2, RM1**	OM2	OM3

- These loops have been commissioned and are stable.

- An alternate way to center the ASC AS WFS at DC is by turning on the OMC QPD centering, which also uses OM1, OM2. (alog 14575, alog 14616)

* RM2 is off diagonal term (factor of -0.86)
** RM1 is off-diagonal term (factor of -0.25)

Initial Alignment

- All controlled by guardian, and usually runs fairly smoothly.

- Green WFS still in progress

- …More details from Keita/Kiwamu

Some Next Steps (out of many)

- Work on more beam input pointing/alignment to increase power recycling gain
- Measure all the input sensing matrices for the ASC loops
- Now that the DRMI is more stable and reliable, we can try to reduce the COMM IR offset and transition from COMM handoff to IR in transmission
- Commissioning Calendar ([alog 14636](#))

Appendix

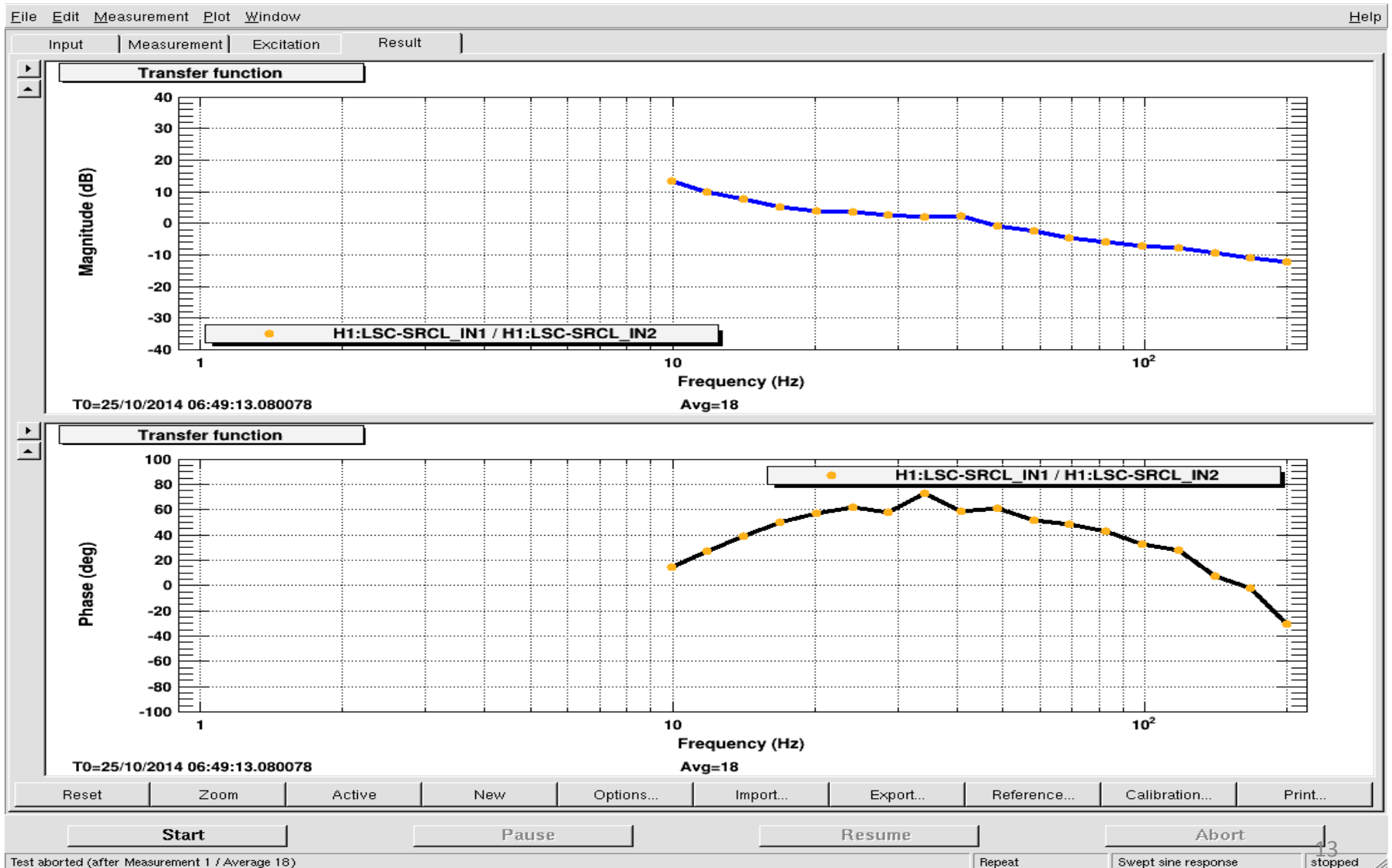# MICH Loop (as of 10/24/2014)
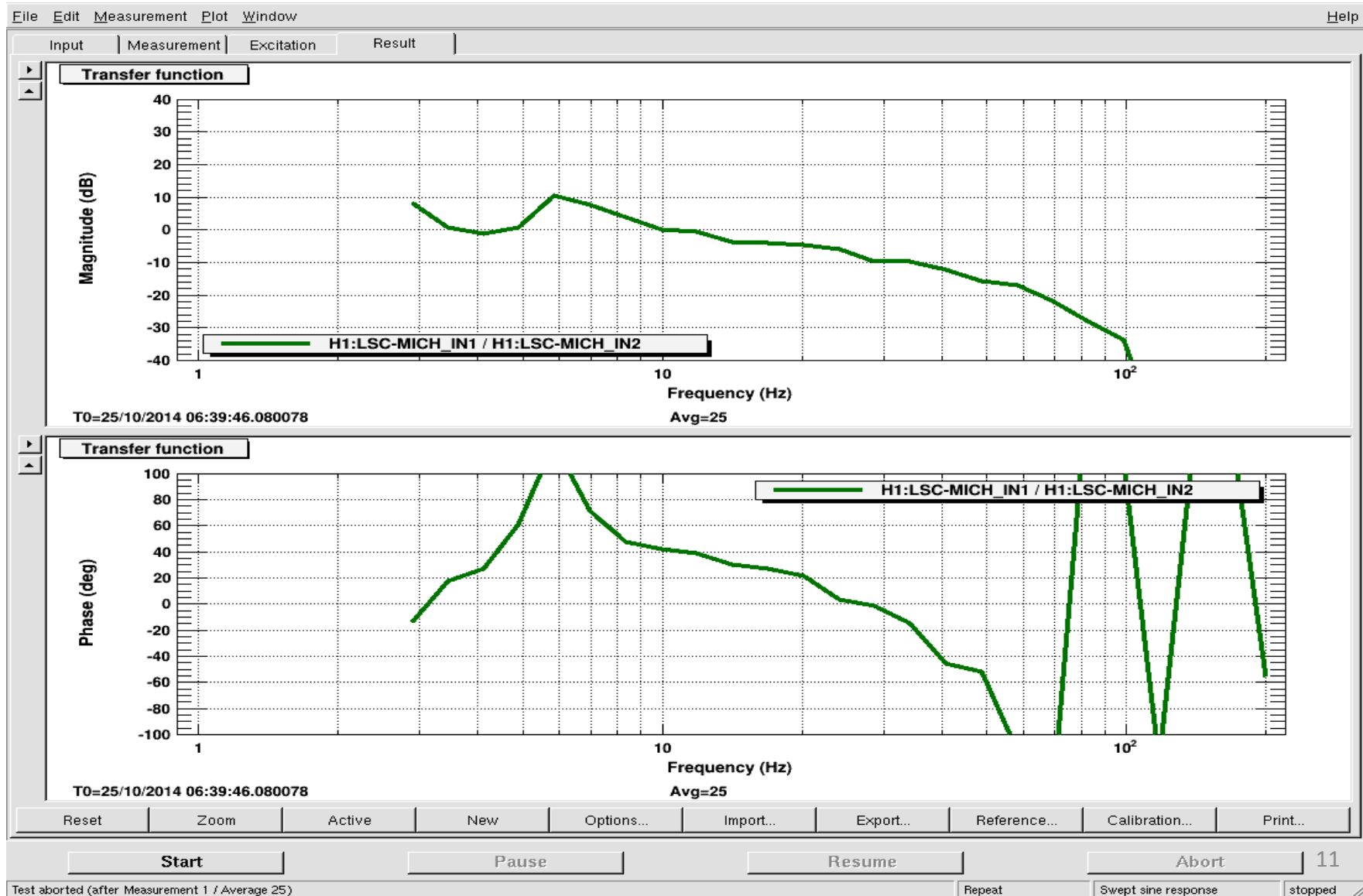
PRCL Loop (as of 10/24/2014)
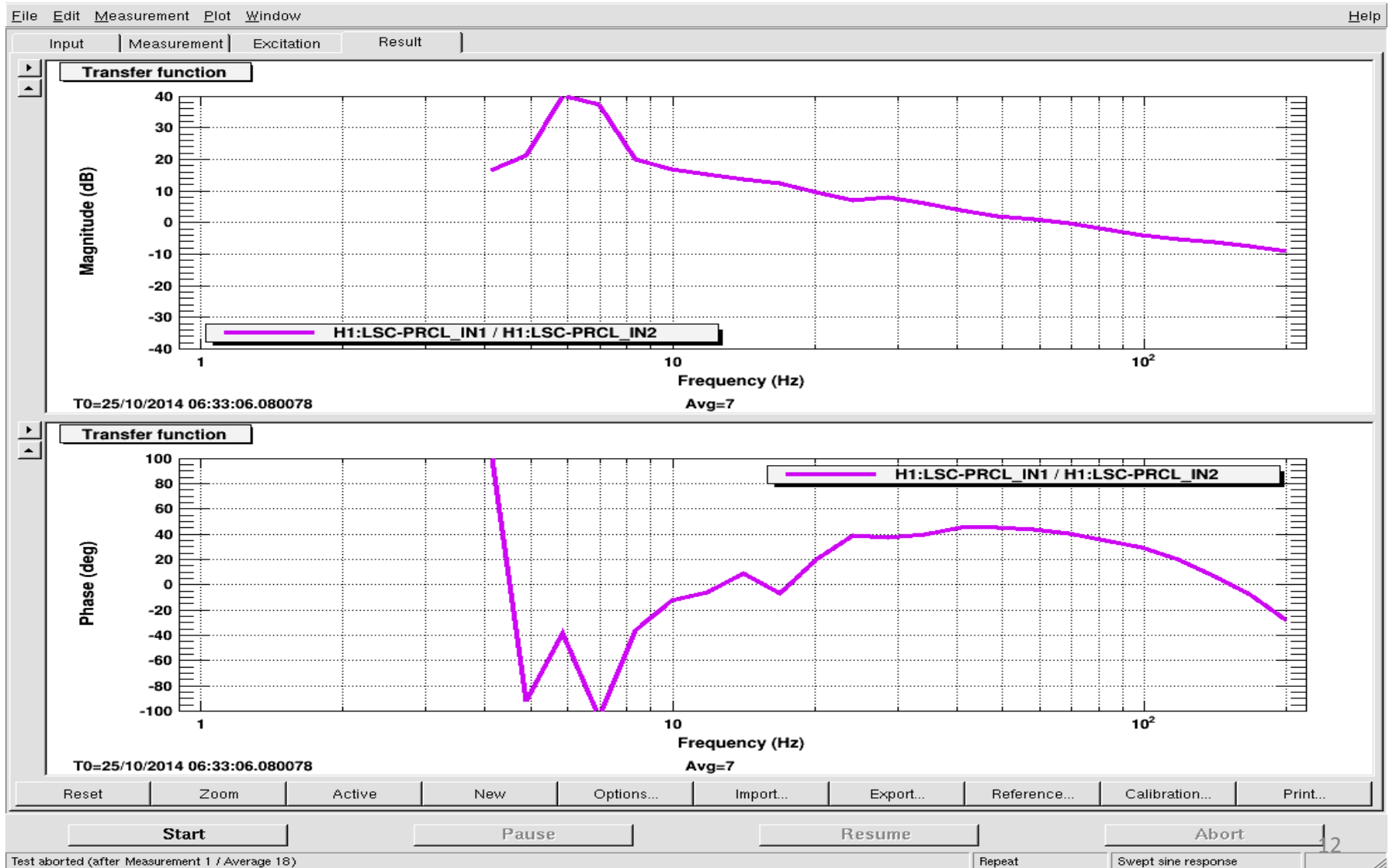
SRCL Loop (as of 10/14/2014)

DRMI Status (OLD)

- In the process of stabilizing this loop.
- At 10W, down time is approx 40 min. Once the cavity is locked we see mode hopping, which causes lock loss. Adjusting SCRL offset to -800 reduces the mode hopping ([alog 14531](#)).
- At 1W, the down time is shorter and the mode hopping is less significant.