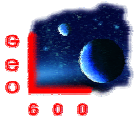


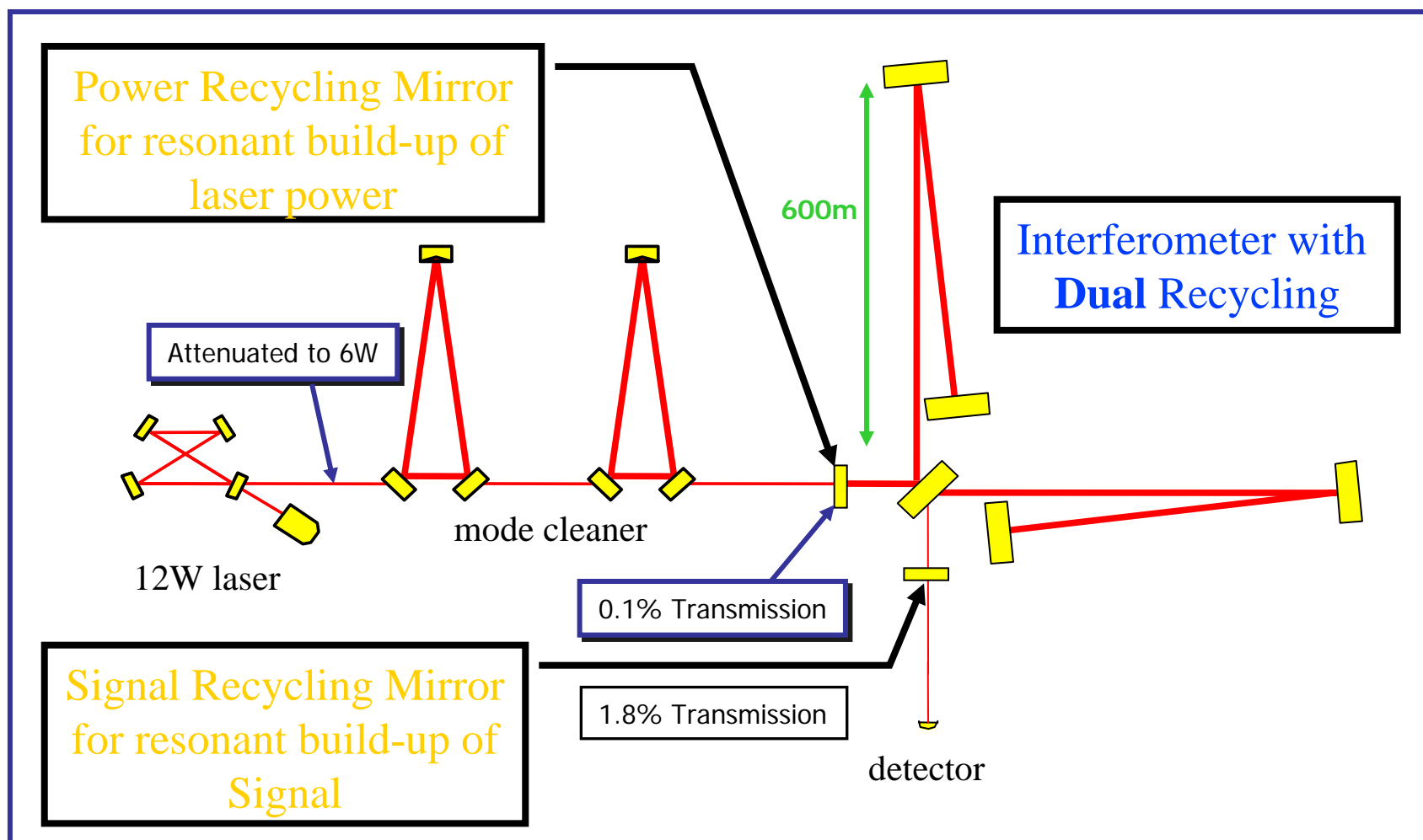
GEO 600 Update August 05

J. Hough for the GEO project

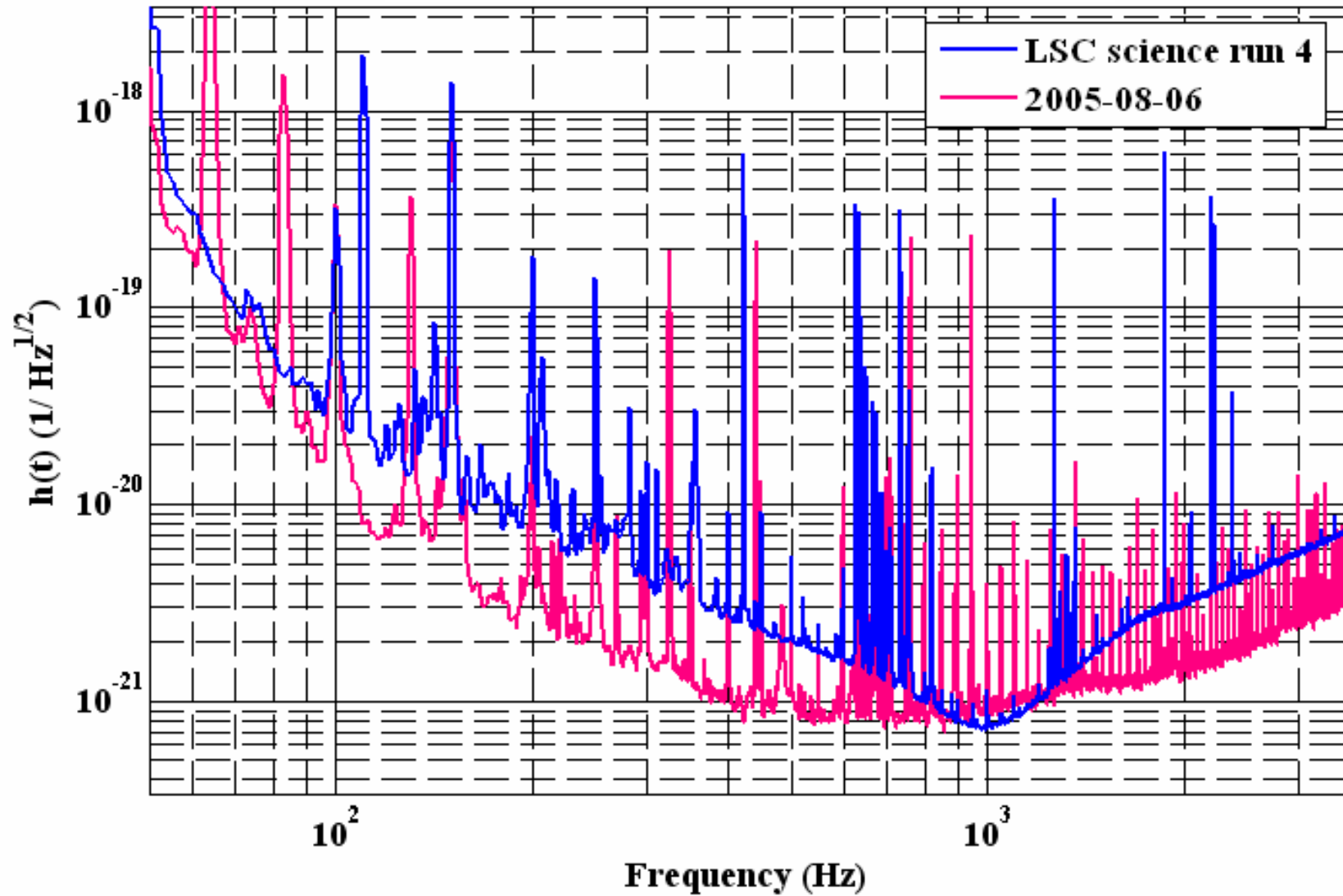
LIGO-G050419-00-Z



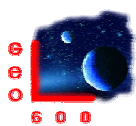
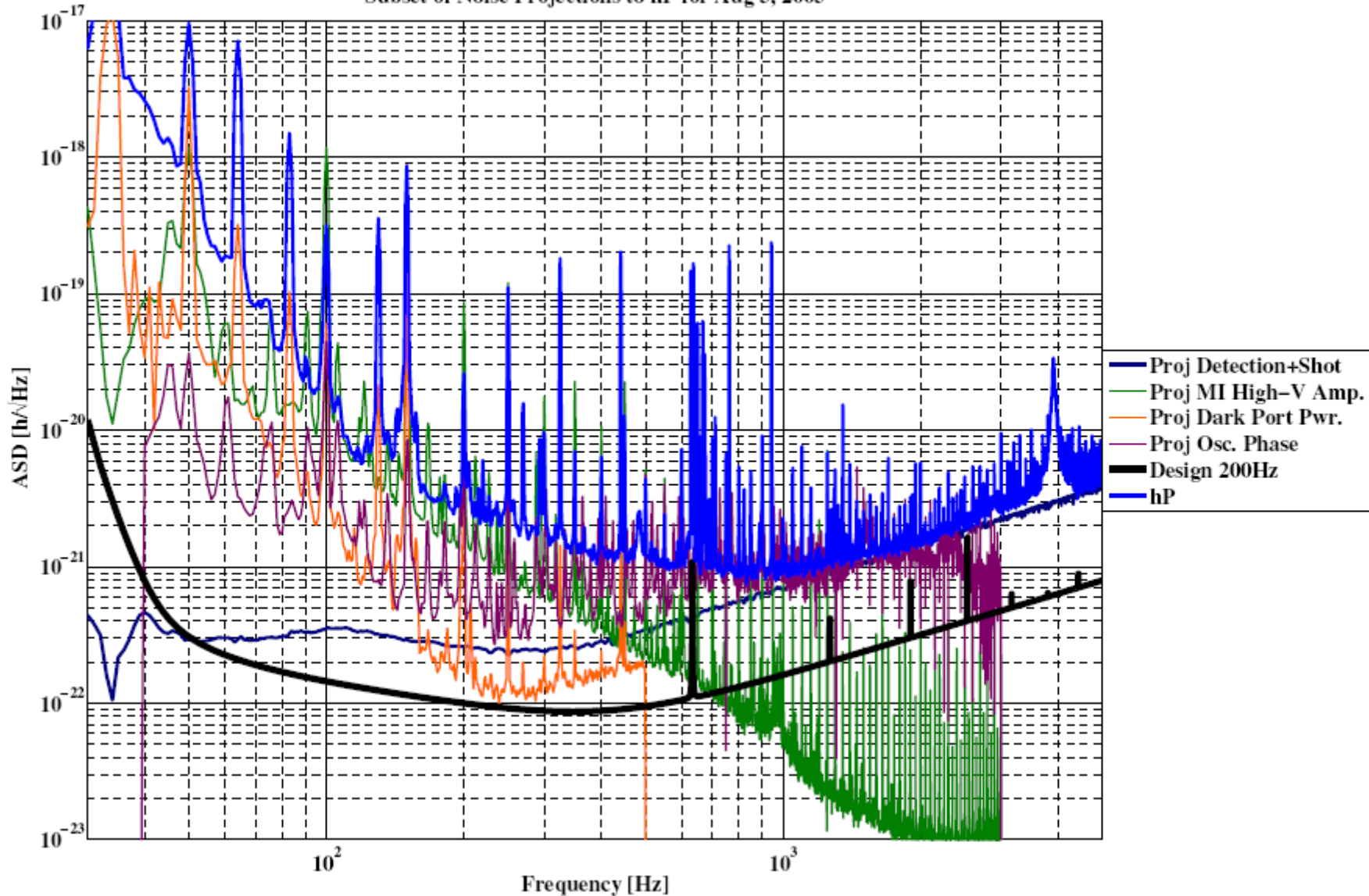
GEO600 Optical Layout Aug 2005



GEO Sensitivity



Subset of Noise Projections to hP for Aug 5, 2005

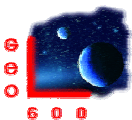


Josh Smith

LIGO-G050419-00-Z

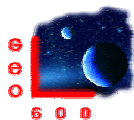
Noise projections (August 05): main contributions

- **HF: detector dark noise and shot noise**
 - Increase laser power, increase modulation index, possibly decrease dark noise
- **Michelson electronics noise**
 - Whiten signal from mixer, low pass after HV amplifier to electrostatic drive - expect factor 10 improvement over band
 - Reduce ESD bias in lock (full range needed for acquisition only) - expect factor 5~10 improvement around 100 Hz.
- **RF/phase noise**
 - under investigation, some improvements made already (including compensation of quadrature RF at mixer)
- **Require to improve intensity noise and intermediate mass feedback noise too**



Improving sensitivity and maintaining reliability

- Focus on frequency band from 100 Hz to 1 kHz - esp. around 300 Hz.
 - Digital SR lock (done)
 - Quadrature phase cancellation (done)
 - Whitening MI electronics (in progress.)
 - ESD bias reduction
- Maintain locking reliability by keeping actuation range high while reducing noise
 - Digital SR lock
 - MI whitening
 - Minor improvements to controls



Current Puzzle

- Power inside recycling cavity factor or 4 to 5 too low
- Consistent with total loss of about 650 ppm
- But where is the loss?
- To be resolved

