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# H1 Squeezer Experiment

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ANU, AEI, MIT, CIT and LHO

Ping Koy Lam, Nergis Mavalvala, David McClelland, Roman Schnabel,  
Daniel Sigg, Henning Vahlbruch and Stan Whitcomb (so far)

# Motivation

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- ❑ High power operation in future detectors
  - Biggest remaining technical risk (after DC readout)
  - Squeezing allows for lower laser power
- ❑ Squeezer technology now ready
  - 7 dB of squeezing down to 10 Hz
  - Has been demonstrated on a bench and on interferometers (40M)

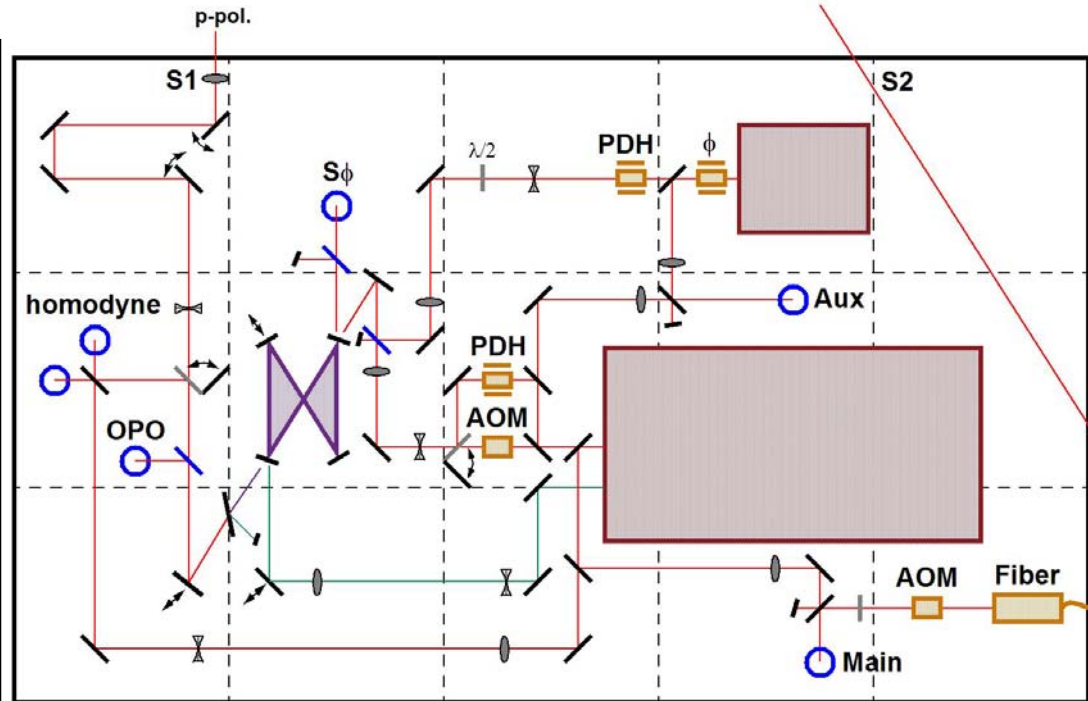
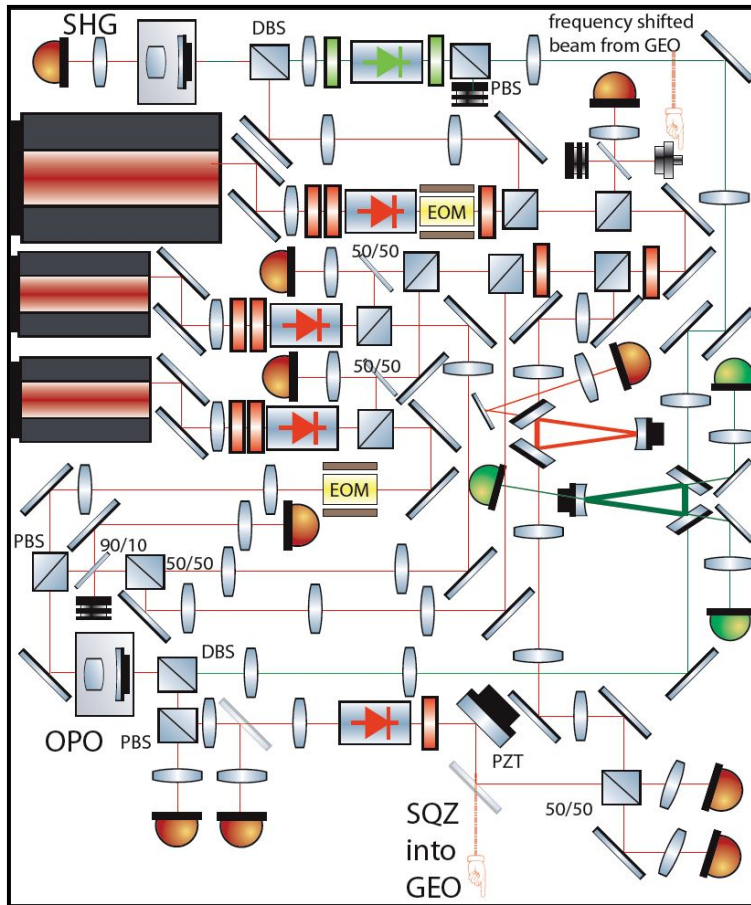
## **Missing: Low frequency noise demonstration**

- ❑ Planned Experiments
  - GEO600: prototype for long baseline interferometers
  - Hanford H1: low noise demonstration

# Sketches (very preliminary)

GEO600

H1



Same principles and technology!  
Complementary goals

# H1 Squeezer Time Line



- ❑ Full fletched proposal to LIGO lab: August 2008
  - Approval (hopefully): September 2008
- ❑ Construction
  - Build breadboard by fall 2009
  - Testing and characterization by mid 2010 → send to LHO
- ❑ Experiment on H1: Feb 2011 to Sep 2011

# Progress

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- Wiki: <http://baikal.mit.edu/sqwiki/H1Squeezer>
  - Email list: <http://mm.ligo.caltech.edu/mailman/listinfo/squeezer>
- Progress
  - Most technical questions addressed
    - ❖ OPA configuration, SHG topology, auxiliary lasers, fiber stabilization, in-vacuum Faraday modifications, physical setup at H1, concepts for electronics, scattering, etc.
  - Preliminary layout available
  - Working on a budget
  - Schedule/workload: next

**Squeezing is an exciting new technology!**