Present LIGO configuration research

Phase Noise Interferometer (MIT 5m)

- To demonstrate initial LIGO ifo fringe splitting: 10^{-10} rad/rHz
- 50 - 100 W circulating power (2+ W laser, 30+ recycling)
- Single-bounce power recycled Michelson
- Start with fiber mode cleaner, later cavity

Status:

- Stabilized Ar laser installed, servo tuning underway
- Vacuum system qualified, stacks being installed
- Suspensions for first experiments fabricated
- First experiments this spring

Optical recombination of suspended FP (Caltech 40m)

- To aid in suppressing common mode light, noise
- To research locking of full initial LIGO configuration
- Power recycled Michelson with Fabry Perot cavities
- Optical storage times long compared with velocity*width

Status:

- Masses asymmetrized, incremental changes planned
- Preparations for changes in modulation underway
- Modeling of signals and servos well advanced for cavities

Configuration tests

Fixed-Mass length and alignment research

- Breadboard of initial LIGO configuration
- Principal goal: demonstration of alignment Wavefront Sensing
- Intermediate goal: first realization of intended length control
- No noise or servo information; only signal measurements

Status

- Extensive modeling of frequencies, detailed optical design finished
- Frequency-stabilized laser servo tuning underway
- Modulation system (12, 25, 37, 390 MHz) assembled
- Interferometer assembly just starting
- Wavefront sensors in second iteration
- First measurements this fall