

# LSC Six-Month Progress Report

**Organization** University of Colorado (JILA)

**LIGO-M990370-00-M**

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- a) Active isolation - Noise around 10 Hz has been a persistent and unexplained problem in the JILA active isolation system. This noise can be characterized as having a somewhat variable spectrum and not affected by system gain. A surprising source was identified. It appears that the hallway leading to the subterranean vault where the system is located is acting as an organ pipe, and resonating at these subaudible frequencies. This infrasonic noise is being coupled to the isolation system through the quiet house/draft shield that encloses the isolation system. Opening the door at the far end of the hall affects the frequency, and closing the door at the near end substantially reduces the amplitude. Joe Giaime, a former member of the group, discovered this curious fact during a visit to JILA. The system was not operational during most of this period due to the moving of other experiments in the room.
- b) Advanced seismometers - Tara Trumbull, a graduate student working on a new seismometer design, left graduate school for a position in industry. Given the emerging picture that advanced seismometers will not be needed in the LIGO II isolation system, we have de-emphasized this activity.
- c) Stochastic Forces, Suspensions and Isolations Development Group - We have worked with other Group members in the development of an active isolation system design for LIGO II. This work has involved developing a reference design and evaluating its anticipated performance in LIGO II. In this period, we attended the design summit held at MIT 13-16 May '99. Jim Faller made one trip to Glasgow to collaborate with GEO personnel on technical challenges of advanced suspensions.
- d) Phase Modulators - Hall and Taubman have been developing schemes to reduce the spatially varying amplitude modulation imposed by AOMs. After trying a couple of methods noted in previous progress reports, they have hit upon a scheme based on a light sensitive resistor. Narrowband correction for AM noise turns out to require mixing of control signals in both quadratures. They are working on circuits to accomplish that.