

A study of transient noise sources in  
LIGO

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## Relevant experience of investigators:

- J. Giaime, Assistant Professor, LSU, new as of Fall 1999.
  - MIT; designed, built and tested prototype seismic isolation stack, candidate length sensing and control scheme.
  - JILA; worked on active seismic isolation platform for advanced LIGO.
  - MIT; served as “installation director” at LLO.
  
- W. Johnson, Associate Professor, LSU.
  - With W. Hamilton took ALLEGRO to current status as a reliable GW detector, running continuously and consistently.
  - Wrote data analysis and diagnostic code for ALLEGRO.
  - part of working group developing LIGO-II seismic isolation.

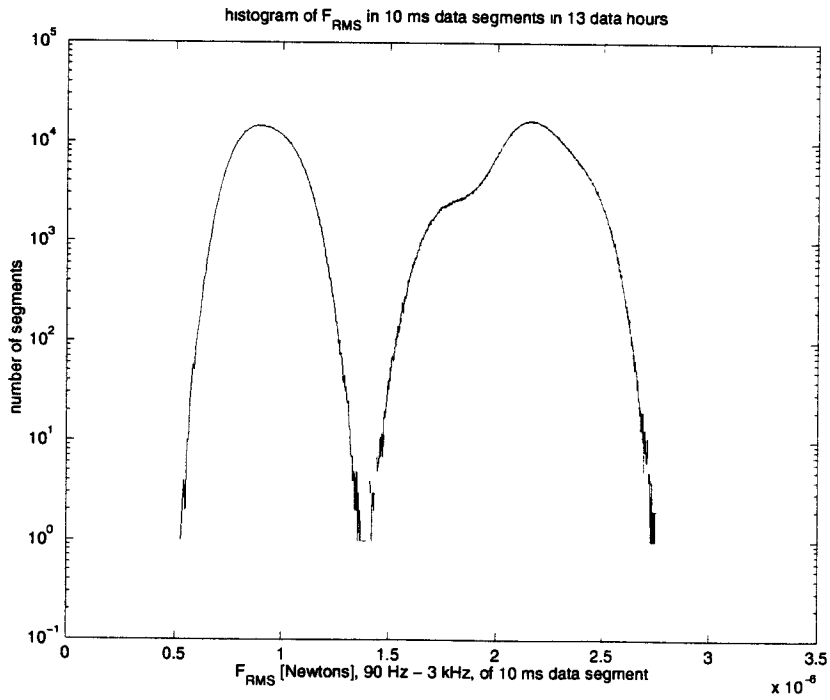
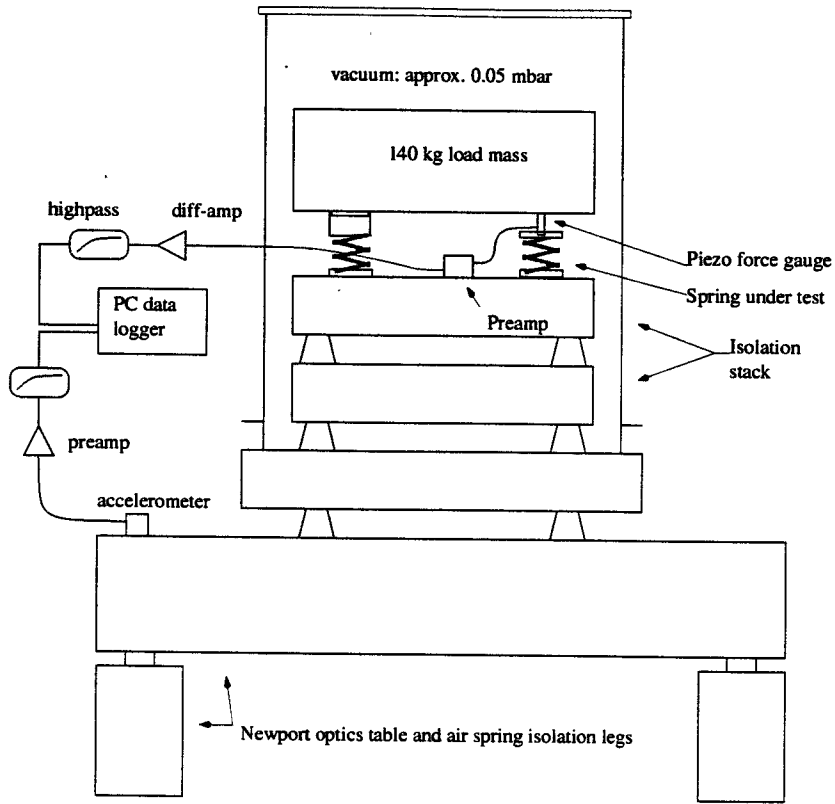
- R. McNeil, Professor, LSU.
  - Experience with large-scale particle physics experiments.
  - Designed and constructed cosmic-ray telescope, and the data acquisition/diagnostics system for it.
  - familiar with data simulation techniques for large experiments.

## Institutional Support:

- Department selected as one of 12 programs within LSU for resource priority.
- Within department and College of Basic Science, broad and long-term coupling to LIGO Livingston Observatory is a stated priority.
- Giaime given startup funds; will use them to begin and augment this research.
- Location  $\approx$  14 LIGO-arm-lengths from LLO, allowing all—faculty, postdocs, students—to work at LIGO daily.
- Current GW faculty includes assistant, associate, and full professors, a sign of long-term commitment from LSU to our field.
- Close association with the established ALLEGRO cryogenic bar detector group.

## Proposed Activities:

1. Support LIGO online diagnostics (Giaime and McNeil).
  - Support commissioning of GDS.
  - Take on continuing responsibility for set of diagnostic tests and adjustments during detector operation.
  - Transient searches and analysis.
  
2. Transient test facility.
  - Quiet and transient-free measurement facility to establish baseline energy release statistics at the component level.
  - Develop model (within E2E framework) propagating measured rates or limits to detector observables.
  - experiment to be assembled at LSU, then moved to LLO during Nicholson Hall construction.



### 3. LIGO-II seismic isolation research.

- Collaboration with the LSC suspensions and isolation working group; will contribute to whichever design scheme is chosen for LIGO-II
- Currently working on design and tests of a stiff-suspension active isolation system with MIT, Stanford and JILA.
- will use transient test facility to characterize electrical and mechanical assemblies, joints, and flexures.
- hope to have role in eventual integration.