LASER INTERFEROMETER GRAVITATIONAL WAVE OBSERVATORY

LIGO Laboratory / LIGO Scientific Collaboration

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Report from the Thermal Noise Interferometer Advisory Board Meeting of November 2008

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The Thermal Noise Interferometer Advisory Board met by phone with Eric Black, Akira Villar, and Greg Ogin of the TNI. The original call did not have Sheila Rowan on it. Sheila discussed TNI issues with Gregg Harry and Eric Gustafson the following Friday after a monthly coating telecom. The purpose of the call was to discuss the proposal to potentially not pursue TNI measurements for the foreseeable future and specifically to determine if this would be harmful to ongoing coating research.

The TNI Advisory Board finds that not having new measurements of thermal noise from coatings once the measurements on the Advanced LIGO coating are made will not be overly harmful to research efforts to reduce coating thermal noise beyond expected Advanced LIGO levels.

The Advisory Board understands that this potential shut down of the TNI is part of a re-evaluation of research priorities at LIGO-Caltech. The Board suggests that the Caltech team carefully consider the role the TNI could play in different types of precision measurements, especially in the context of the possibilities and limitations of other prototype interferometers like the Caltech 40 m, the Glasgow interferometer, LASTI, and various proposed torsion balance experiments before deciding to put aside TNI research. It would also encourage investigations of alternatives to the TNI such as the mini-TNI that was discussed.

Possible measurements that might be worthwhile using the TNI and should be considered as part of the re-evaluation include direct mirror thermal noise (and possibly non-Gaussian noise) from silicate bonds, directly measured Gaussian and non-Gaussian noise from electric charge buildup, and directly measure coating thermal noise versus beam spot size to compare with both theory and FEA modeling. There could be future uses for the TNI as well including measuring coating thermal noise from flat topped beams, from other techniques designed to lower coating thermal noise without improving materials (interferometer mirrors, coating-less mirrors, Fabry-Perot cavities in coatings, etc) as well any new ideas that are developed.