Abstract Submitted
for the APR13 Meeting of
The American Physical Society

Analysis of a dense seismic array to determine sources of Newtonian gravitational noise at the LIGO sites JENNIFER DRIGGERS, JAN HARMS, VIVIEN RAYMOND, RANA ADHIKARI, California Institute of Technology — Newtonian gravitational noise will be an important noise contributor for Advanced LIGO and proposed upgrades to Advanced LIGO, between 5Hz and 30Hz. A major step toward subtracting this Newtonian noise and thus improving the astrophysical detection ability of ground-based gravitational wave observatories is determining the dominant sources of seismic noise, which contribute most strongly to the Newtonian noise. An array of 44 sensors was installed at the LIGO Hanford site for 8 months, including the duration of a commissioning test of a 4km Fabry-Perot cavity. We will show results from this array, including application of LIGO data analysis methods to seismic source localization, relative importance of locally generated versus far-field seismic disturbances, and estimates of residual seismic noise and Newtonian noise present in the cavity length data. We will discuss how this information will help improve noise subtraction algorithms, particularly in terms of optimal sensor placement.

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Date submitted: 11 Jan 2013 Electronic form version 1.4