Abstract Submitted
for the APR11 Meeting of
The American Physical Society

Search for Gravitational Wave Bursts from Six Magnetars PETER KALMUS, Caltech, LIGO SCIENTIFIC COLLABORATION, VIRGO COLLABORATION — Soft gamma repeaters (SGRs) and anomalous X-ray pulsars (AXPs) are thought to be magnetars: neutron stars powered by extreme magnetic fields. These rare objects sporadically produce gamma-ray bursts which could be accompanied by gravitational waves (GWs). We present the results of a search for GW bursts from six galactic magnetars that is sensitive to neutron star f-modes, thought to be the most efficient GW emitting oscillatory modes in compact stars. One of them, SGR 0501+4516, is likely $\sim 1\,\mathrm{kpc}$ from Earth, an order of magnitude closer than magnetars targeted in previous GW searches. A second, AXP 1E 1547.0−5408, gave a burst with an estimated isotropic energy $> 10^{44}$ erg which is comparable to the giant flares. We find no evidence of GWs associated with a sample of 1279 electromagnetic triggers from six magnetars occurring between November 2006 and June 2009, in GW data from the LIGO, Virgo, and GEO600 detectors. Our lowest model-dependent GW emission energy upper limits for band- and time-limited white noise bursts in the detector sensitive band, and for f-mode ringdowns (at 1090 Hz), are $3.0 \times 10^{44} d_1^2\,\mathrm{erg}$ and $1.4 \times 10^{47} d_1^2\,\mathrm{erg}$ respectively, where $d_1 = \frac{d_{0501}}{1\mathrm{kpc}}$ and d_{0501} is the distance to SGR 0501+4516. These limits are an order of magnitude lower than any previous, and approach the range of electromagnetic energies seen in SGR giant flares for the first time.

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Date submitted: 14 Jan 2011 Electronic form version 1.4