

Abstract Submitted  
for the APR09 Meeting of  
The American Physical Society

**delayRatio: A Gravitational Wave Event Physical Likelihood Estimator Based on Detection Delays and SNR Ratios**<sup>1</sup> AMBER STUVER, California Institute of Technology/LIGO Livingston — delayRatio is an efficient physical likelihood estimator which is designed to be used as part of a candidate coincident burst/inspiral gravitational wave event follow-up investigation. Given the event parameter estimation of detection delays and the SNR ratio between a pair of detectors, delayRatio returns a Boolean indicating if the parameters fall within physical ranges determined by using polarization averaged antenna patterns. Since polarization effects can cause physical signals to lay outside the polarization averaged bounds, probabilities based on Monte Carlo simulations of physical signals are also calculated to estimate the likelihood of a polarized signal that falls outside of the polarization averaged bounds. This work has also been generalized for 3+ detectors. For these combinations, the primary likelihood condition is the physicality of detection delays while SNR ratios give secondary validation measures. Therefore, this work has easily been extended to function as a simplistic source location tool based solely on the detection delays.

<sup>1</sup>Research supported by the National Science Foundation.

Amber Stuver  
California Institute of Technology/LIGO Livingston

Date submitted: 09 Jan 2009

Electronic form version 1.4