Detection of gravitational wave signals from NS-NS inspirals in presence of non-stationary noise WENHUI WANG, SOMA MUKHERJEE, Department of Physics and Astronomy, University of Texas at Brownsville, UNIVERSITY OF TEXAS AT BROWNSVILLE TEAM — This work presents a study of the efficiency of detection of gravitational wave signals from neutron star - neutron star (NS-NS) binary systems as a function of stationarity of the underlying detector noise. A matched filter based search pipeline is used. First, NS-NS inspiral signals are injected in stationary noise and the detection efficiency is noted. Next, non-stationary noise is modeled in a realistic manner by using statistical ARMA models. The reason behind this choice is motivated by the fact that real noise from the LIGO detectors can be modeled (up to the second moment) in the same manner [1]. Detection efficiency of the search pipeline is studied for several non-stationary noise models thus created. Results show that when the noise is non-stationary and the signal-to-noise-ratio (SNR) is low, the matched filter cannot provide a very good detection. We thus develop a variation of the matched filter that improves detection results in presence of non-stationary noise.

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