RESULTS OF THE RECENT SEARCH FOR AN ISOTROPIC STOCHASTIC BACKGROUND USING ADVANCED LIGO DATA

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The whole world was excited to hear that the first, directly detected, gravitational waves arose from the merger of two black holes of about 30 solar masses at a redshift close to 0.1. The existence of black holes of such mass, and of binaries composed of such black holes, raises new questions about the abundance of such sources and of their possible origins. In light of the detections of one binary neutron star and ten binary black hole mergers by the Advanced LIGO and Virgo Detectors, a particularly promising future gravitational wave source is the stochastic background from compact binary coalescences that are too weak and too numerous to detect individually. In this talk we will discuss implications of the existence of such sources. We present results combining cross-correlation analyses on data from Advanced LIGO's first and second observing runs. Finding no evidence yet for a stochastic background, we place upper limits on the normalized energy density in gravitational waves at the 95% credible level of $\Omega_{\rm GW} < 6.0 \times 10^{-8}$ for a frequency-independent (flat) background and $\Omega_{\rm GW} < 4.8 \times 10^{-8}$ at 25 Hz for a background of compact binary coalescences - an improvement buy a factor of 2.8 over the previous O1 result alone. We also discuss the implication of our results for models of compact binaries and cosmic string backgrounds, and present a conservative estimate of the correlated broadband noise due to the magnetic Schumann resonances in O2.