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Constraining properties of black hole mimickers with gravitational wave observations of binary black holes NATHAN JOHNSON-MCDANIEL, DAMTP, Cambridge, ARUNAVA MUKHERJEE, AEI, Hannover, RAHUL KASHYAP, PARAMESWARAN AJITH, ICTS-TIFR, WALTER DEL POZZO, University of Pisa, SALVATORE VITALE, MIT, TANJA HINDERER, Radboud University Nijmegen — Observations of gravitational waves from compact binary coalescences using the Advanced LIGO and Advanced Virgo detectors are now starting to become routine. All but one of the observations so far has been identified as coming from a binary black hole coalescence. These signals are found to be consistent with the predictions of general relativity for binary black hole coalescences, within statistical uncertainties. However, there remains the possibility that these signals could have been produced by the coalescence of some "black hole mimickers" instead of black holes. Black hole mimickers are massive, dark, compact objects, such as boson stars and gravastars, which can emulate many of the properties of black holes. However, such objects, if they exist, would generically have nonzero tidal deformabilities, while black holes have zero tidal deformability in general relativity. These tidal deformabilities imprint themselves on the gravitational wave signal. Using full Bayesian parameter estimation, we investigate the constraints it is possible to place on the properties of black hole mimickers (e.g., coupling constants for boson stars) if binaries of these objects are to produce the signals detected by LIGO and Virgo.

Nathan Johnson-McDaniel
DAMTP, Cambridge

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