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Injection analysis with the NANOGrav 11-yr dataset NIHAN POL, West Virginia Univ, STEPHEN TAYLOR, Vanderbilt University, JEFFREY HAZBOUN, University of Washington, Bothell — We develop a new method for characterizing the Bayesian response of a pulsar timing array (PTA) detector to the presence of a stochastic gravitational wave background (SGWB) in the presence of real, potentially unmodeled noise processes. This method involves the injection of a range of SGWB amplitudes into the PTA dataset and recovery of these signals through the Bayesian detection pipeline. Applying this method to the NANOGrav 11-yr dataset, we find that while this dataset would have made a conclusive detection (Bayes' factor ¿ 100) of a common red process at the published GW-strain amplitude upper limit of 1.45e-15, it would have begun to see hints of the SGWB in the common red process (Bayes' factors ¿ 20) at GW-strain amplitudes greater than 9e-16. We also quantify how the parameter estimation depends on the significance of the SGWB signal in the dataset.

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