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Detectability of the chiral GWs from audible axions with the LISA-Taiji network

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The chiral gravitational wave background (GWB) can be produced by axion-like fields in the early universe. We perform parameter estimation for two types of chiral GWB with the LISA-Taiji network: axion-dark photon coupling and axion-Nieh-Yan coupling. We estimate the spectral parameters of these two mechanisms induced by axion and determine the normalized model parameters using the Fisher information matrix. For highly chiral GWB signals that we choose to analyze in the mHz band, the normalized model parameters are constrained with a relative error less than 6.7% (dark photon coupling) and 2.2% (Nieh-Yan coupling) at the one-sigma confidence level. The circular polarization parameters are constrained with a relative error around 21% (dark photon coupling) and 6.2% (Nieh-Yan coupling) at the one-sigma confidence level.

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