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Investigation of gravitational wave background from the domain walls in the early universe using pulsar timing arrays

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High-precision measurements of pulsar timing arrays (PTA) allow us to probe stochastic gravitational wave background (GWB), which is generated by various processes in the Universe. Domain walls (DWs) that emerged in the early Universe could be one of the hypothetical sources of such GWB. In this work, two different models of DWs are considered. Such objects produce GWB with a distinctive power spectrum. In this work we develop an algorithm to search for such signals in PTA datasets. The algorithm has been validated on a simulated pulsar timing data. We apply the analysis scheme on the latest data release of the European Pulsar Timing Array collaboration (EPTA). We present obtained estimates and constraints on physical parameters, which describe the evolution of melting DWs and biased DWs.

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