

Abstract Submitted
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Towards solving the pulsar timing sampling problem¹ RUTGER VAN HAASTEREN, JUSTIN ELLIS, MICHELE VALLISNERI, Jet Propulsion Lab, NANOGRAV COLLABORATION — Bayesian data analysis of Pulsar Timing Array (PTA) has proved to be a computationally challenging problem, with scaling relations that are super-linear in both the number of pulsars and the number of model parameters. Thus far, our best models cannot be used when analyzing full (international) pulsar timing array datasets in the search for gravitational waves, and shortcuts always need to be made. A promising approach in the literature, based on Hamiltonian sampling techniques, has been shown to be infeasible in realistic datasets due to phase transition behavior of the likelihood. We have introduced a coordinate transformation that mitigates this phase transition behavior, and makes Hamiltonian sampling efficient. This makes a full (stochastic) gravitational-wave search in pulsar timing data feasible with our most up-to-date models. This method scales almost linearly with the number of pulsars.

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