

To log or not to log: NANOGrav bounds on the tension of stable cosmic strings

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In the NANOGrav 15-year New Physics analysis (arXiv:2306.16219), a log-uniform prior on $G\mu$ was imposed to determine upper limits on the tension of stable cosmic strings. Here, we examine the prior dependence of this bound through comparison with new upper limits obtained using a uniform prior on $G\mu$. New posterior distributions and upper limits on stable cosmic string tension were calculated using semi-analytic and numerical (MCMC) methods, and show that the 95% bounds are robust against the prior choice, up to variations within a factor of 1.5 or so. We also compare the cosmic string model with a log-uniform prior and the same model with a uniform prior in terms of the associated Bayes factor. At face value, this Bayes factor seems to indicate a preference for a uniform prior choice; however, upon closer inspection, it serves as an illustration of the underlying sensitivity to prior volume effects.

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