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Pulsar Timing Limits on Very Low Frequency Stochastic Gravitational Radiation

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Abstract. A low-frequency, stochastic gravitational radiation background can be detected through the irregularities it induces in pulsar arrival times. In this poster we re-examine pulsar timing data presented in Kaspi, Taylor and Ryba (1994) [Ap.J., **428**, p. 713] and present an optimal statistical framework for using timing data from a single pulsar to constrain the energy density in a gravitational wave background. Observations of PSR B1855+09 yield an upper limit (95% confidence) 1.0×10^{-8} or (90% confidence) 4.8×10^{-9} of the closure density at frequency 4.4×10^{-9} Hz. This result probably rules out cosmological models that use cosmic strings as seeds for galaxy formation. Using combined observations of the orbital decay of four binary pulsars we also derive weaker limits at frequencies as low as 10^{-12} Hz.

A more complete description of this work can be found in Thorsett, S. E. and Dewey, R. J. 1996, *Physical Review D*, **53**, p. 3468.

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