

Gravitational waves from quasi-stable cosmic strings and PTA data

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We discuss the stochastic gravitational wave background emitted from a network of ‘quasi-stable’ strings (QSS) and its realization in grand unified theories. A symmetry breaking in the early universe produces monopoles that suffer partial inflation. A subsequent symmetry breaking at a lower energy scale creates cosmic strings that are effectively stable against the breaking via Schwinger monopole-pair creation. As the monopoles reenter the horizon, we will have monopole-antimonopoles connected by strings, and further loop formation essentially ceases. Consequently, the lower frequency part of the gravitational wave spectrum will be suppressed compared to that of topologically stable cosmic strings. The gravitational radiation emitted in the early universe by QSS with a dimensionless string tension $G\mu \sim 10^{-6}$, is compatible with the exciting evidence of low-frequency gravitational background in PTA data, as well as the recent LIGO-VIRGO constraints, provided the superheavy strings and monopoles experience a certain amount of inflation.

Track type

Gravitational waves

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