

Graviton Mass Bound From Pulsars

We apply Bayesian analysis to binary pulsar timing to put new bounds on the graviton mass in the linearized Fierz-Pauli theory and cubic Galileon theory.

Miao, Shao, Ma, Phys. Rev. D 99 (2019) 123015 [arXiv:1905.12836]

Shao, Wex, Zhou, Phys. Rev. D 102 (2020) 024069 [arXiv:2007.04531]

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Are Gravitons Massless?

radiative tests in the strong field with pulsar timing



- In Einstein's General Relativity, gravitons are massless
- Massive graviton theories have profound implications to gravitation and cosmology
- The mass of graviton in general introduces extra gravitational radiation in a binary system
- Binary pulsars are sensitive to the extra gravitational radiation
- We collect a handful binary pulsars in a Bayesian framework to constrain the extra gravitational radiation, thus the mass of graviton

New Graviton Mass Bounds from Pulsars

linearized Fierz-Pauli theory & cubic Galileon theory

- We bound the graviton mass to
 - $m_g < 5.2 \times 10^{-21} \text{ eV}/c^2$ in the linearized Fierz-Pauli theory
 - $m_g < 2 \times 10^{-28} \text{ eV}/c^2$ in the cubic Galileon theory
- Future: FAST, SKA telescopes
 - Pulsar-BH systems
 - highly eccentric orbits

