

Evidence of Nano-Hertz Gravitational Wave Background from Pulsar Timing Array

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Pulsar timing array is an experiment to detect gravitational waves with a frequency of nanohertz by accurate long-term observation of pulsars. The pulsar timing array has various systematic errors such as dispersion delays caused by interstellar plasma and uncertainty in the position and motion of solar system objects, which inhibit detection of gravitational wave signals. Recently, there have been signs of gravitational wave background through appropriate modeling of systematic errors and correlation between pulsars. The estimated power spectrum of gravitational wave background is consistent with one from supermassive black hole binaries, but other possibilities such as secondary generation from density fluctuations and inflation are not excluded. In this talk, I cover the principles of pulsar timing arrays, data analysis methods and the physical interpretation of recent results. In addition, I introduce the Indian Pulsar Timing Array, which is a joint project by India and Japan.

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