

Have pulsar timing array methods detected a cosmological phase transition?

Sunday, 24 September 2023 09:00 (30 minutes)

We show [1] that the recent detection of a gravitational wave (GW) background reported by various pulsar timing array (PTA) collaborations including NANOGrav-15yr, PPTA, EPTA, and CPTA can be explained in terms of first order phase transitions (FOPTs) from dark sector models (DSM). Specifically, we explore a model for first order phase transitions that involves the majoron, a Nambu-Goldstone boson that is emerging from the spontaneous symmetry breaking of a $U(1)_L$ or $U(1)_{B-L}$ symmetry. We show how the predicted GW power spectrum, with a realistic choice of the FOPT parameters, is consistent with $1-\sigma$ deviations from the estimated parameters of the background detected by the PTA collaborations.

[1] A. Addazi, Y.F. Cai, A. Marciano and L. Visinelli, [arXiv:2306.17205 [astro-ph.CO]].

Primary authors: Prof. CAI, Yifu (USTC); Prof. VISINELLI, Luca (TDLI); Prof. MARCIANO, Antonino (Fudan University and INFN Frascati); Prof. ADDAZI, Andrea (Sichuan University)

Presenter: Prof. MARCIANO, Antonino (Fudan University and INFN Frascati)

Session Classification: Sunday 1