Contribution ID: **108** Type: **not specified**

Cold darkogenesis: Hints for baryon asymmetry and dark matter from the PTA signal

Wednesday, 27 August 2025 11:20 (20 minutes)

If the nano-Hz gravitational wave signal observed by Pulsar Timing Array (PTA) experiments originates from a strongly supercooled first-order phase transition, the resulting supercooling at $calO(1)$ GeV temperature necessitates a new mechanism for generating the baryon asymmetry and dark matter, as any pre-existing abundances are diluted. We propose a model of cold darkogenesis, where the winding number changing dynamics of a dark $SU(2)_{\rm D}$ Higgs field generate a dark asymmetry, subsequently transferred to the visible sector via neutron portal interactions. The scenario naturally explains the baryon asymmetry, asymmetric self-interacting dark matter, and the PTA signal, and will be tested in collider and direct detection experiments.

Primary authors: FUJIKURA, KOHEI (U. Tokyo); GIRMOHANTA, Sudhakantha (Tsung-Dao Lee Institute, Shanghai Jiao Tong University); NAKAI, Yuichiro; ZHANG, Zhihao (TDLI)

Presenter: GIRMOHANTA, Sudhakantha (Tsung-Dao Lee Institute, Shanghai Jiao Tong University)

Session Classification: Parallel talks (3)