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# TALK: TALK: Gravitational Wave Symphony from Oscillating Spectator Scalar Fields

*Tuesday, July 2, 2024 2:30 PM (45 minutes)*

Spectator scalar fields can be generically present in the early Universe, and are potentially dark matter candidates. We investigate the prospect of such scalars loop as a generic source of stochastic gravitational wave background (SGWB) due to parametric resonance during their oscillation phase. By systematically analyzing benchmark models through lattice simulations and considering a wide range of parameters, we demonstrate that such a scenario can lead to detectable signals in GW detectors over a broad frequency range and potentially address the recent findings by Pulsar Timing Array experiments. Furthermore, we show that these models naturally yield viable ultra-light, wave-like dark matter candidates and/or dark radiation detectable by CMB observatories. We also explore the potential for realizing low-scale baryogenesis from such an oscillating scalar system and the resultant detectable SGWB signals. This study highlights an intriguing connection between the stochastic gravitational wave background (SGWB) and terrestrial probes for low-energy new particle physics.

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