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Particle Physics at LPTHE

Mardi 17 Octobre 2023, 14 :00
LPTHE, library(References : 2208.14466 and 2307.11639)
Domaines : hep-ph

Titre : *Exploring Cosmological Phase Transitions in the upcoming decades : from the LHC to LISA*

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Résumé : *In this seminar, we investigate the potential for probing cosmological phase transitions using the Large Hadron Collider (LHC) and the Laser Interferometer Space Antenna (LISA) in the upcoming decades. The LHC is expected to remain in operation until 2025, before undergoing a high-luminosity upgrade and operating until 2039. Additionally, LISA, set for launch in the mid-2030s, offers sensitivity to primordial stochastic Gravitational Wave (GW) backgrounds, generated during a First-Order Phase Transition (FOPT) in the early universe. Economical additions of the Standard Model (SM), such as Higgs doublet extensions, are capable of accommodating a first-order electroweak (EW) phase transition, while predicting new particles at the EW scale that may be detectable at the LHC. We demonstrate that the LHC plays a crucial role in shaping the prospects for detecting GW signals from such scenarios. Furthermore, even if new physics resides at higher energy scales inaccessible to the LHC, we can use LISA to probe models incorporating extra B-L gauge forces, explaining dark matter as primordial black holes and accommodating leptogenesis and neutrino masses.*