

Imprints of new physics phenomena: from collider to gravitational waves observables

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Despite the tremendous success of the Standard Model (SM) with its properties remarkably well measured, there is overwhelming phenomenological evidence that strongly suggests the need for physics beyond the current SM, such as explanations for dark matter and neutrino masses. In this presentation we will discuss LISA's potential to reveal further evidence of new physics phenomena through upcoming measurements of the Stochastic Gravitational Wave Background (SGWB) generated from strong first-order phase transitions in the early Universe. As benchmark scenarios, we examine:

- 1) Colour symmetry restoration at low temperatures within a framework featuring two scalar leptoquarks with thermal vacuum expectation values (VEVs).
- 2) The impact of supercooling in abelian extensions of the SM governed by classical scale invariance.
- 3) Phase transitions occurring within a non-abelian dark sector.

Specifically, we explore the conditions that allow these scenarios to be probed at LISA and discuss the potential consequences for collider physics observables. This includes the trilinear Higgs coupling, mixing angles and the mass of new particles.

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