

Thesis Proposal for the Master's Degree in Physics

Title: First-order phase transitions in the Early Universe

Abstract (max 10 lines):

The recent detection of gravitational waves from black hole and neutron star mergers by the LIGO-Virgo collaboration has marked a new era in observational cosmology allowing us to investigate epochs and physical processes inaccessible through electromagnetic observations. Future generations of interferometers will be sensitive enough to detect gravitational waves from early-universe phenomena, such as first-order phase transitions. Although the electroweak phase transition in the Standard Model of particle physics is a smooth crossover, many extensions predict the possibility of first-order transitions. In this context, this thesis work can focus on various aspects of these transitions, including their dynamics, the model-building implications of new theoretical extensions and the potential connections to the observed matter-antimatter asymmetry.

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Laboratory where the thesis is carried out:

Laboratorio di calcolo del gruppo di Fisica delle Particelle Elementari – Dipartimento di Fisica

Type of thesis:

research: theoretical