

# The Higgs boson and the early Universe

The breaking of the electroweak (EW) symmetry in the early Universe, known as the EW phase transition, is a key moment in the very first stages of the evolution of the Universe. It could have given rise to important cosmological relics, such as a stochastic gravitational wave (GW) background, and/or generated the cosmic matter/antimatter asymmetry, whose origin is at present a mystery.

The student will investigate the evolution of the Higgs field in the early Universe and the properties of the EW phase transition in the Standard Model and simple extensions. He/she will then derive predictions for the GW signal from the EW phase transition, and assess their detectability by future GW observatories, which would yield a direct probe of the Higgs dynamics in the early Universe.