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Thesis Title	*Higgs-field stability during cosmic inflation*
Supervisor	N. Tetradis, Professor
Summary	It is possible for a classical field theory to have two homogeneous stable equilibrium states with different energy densities. In the quantum version of the theory, the state with the highest energy density becomes unstable through quantum tunnelling, thus it is a state of false vacuum. We study false vacuum decay to true vacuum, a process which is of great importance in field theory and also in cosmology. In the present thesis we will use scalar Higgs field theory which plays an important role in cosmology. In specific we are interested in the vacuum decay probability of the Higgs field during cosmological inflation. In the first chapter we develop the formalism to calculate the vacuum decay rate in quantum mechanics and in field theory. In the second chapter we generalize the results of the first chapter including gravity and also making the assumption of the thin wall approximation. In the third chapter we calculate the one loop quantum corrections in the effective potential of the Higgs field, from which we will obtain the form of the potential that we will use to study in the fourth chapter for the decay of the Higgs field during cosmological inflation.
Key words	Vacuum decay, Higgs field, Cosmic inflation, Standard Model of Particle Physics, Effective Higgs potential, Gravity
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