

Predictions for Future Collider Experiments

In 2012 the experiments of the LHC (Large Hadron Collider) at CERN (Geneva, Switzerland, www.cern.ch/lhc) discovered a new particle. Its measured properties are (within the uncertainties) in agreement the Higgs boson of the Standard Model (SM) of particle physics. This Higgs particle is responsible for the masses of all other elementary particles.

We are working in a model beyond the SM that can solve various problems of the SM (among others, it contains a Dark Matter particle and predicts the unification of the three forces: electro-magnetic, weak and strong force). This model is called the "Minimal Supersymmetric Standard Model", MSSM. This model does not predict the existence of one Higgs particle, but of five different ones, where one resembles the SM Higgs boson.

The work consists of a) study the basics of the SM and the MSSM b) perform a numerical analysis for the production of these MSSM Higgs bosons

The results will help to confirm or exclude this type of SM extension, based on searches for Higgs bosons.

Required courses: - elementary particle physics - quantum mechanics