Module: Specialization I

Module No.: physics610

Course: Theoretical Particle Physics

Course No.: physics615 **Lecturers:** Profs. of theoretical physics

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Category	Type	Language	Teaching hours	CP	Semester
Elective	Lecture with exercises	English	3+2	7	WT

Requirements:

Preparation:
Advanced quantum theory (physics606)
Quantum field theory (physics755)
Group theory (physics751)

Form of Testing and Examination:
Requirements for the submodule examination (written examination): successful work with the exercises

Length of Course:
1 semester

Aims of the Course:
Introduction to the standard model of elementary particle physics and its extensions (unified theories)

Contents of the Course:
Classical field theory, gauge theories, Higgs mechanism;
Standard model of strong and electroweak interactions;
Supersymmetry and the supersymmetric extension of the standard model;
Grand unified theories (GUTs);
Neutrino physics;
Cosmological aspects of particle physics (dark matter, inflation)

Recommended Literature:
T. P. Cheng, L.F. Li: Gauge theories of elementary particle physics (Clarendon Press, Oxford 1984)
M. E. Peskin, D.V. Schroeder; An introduction to quantum field theory (Addison Wesley, 1995)
J. Wess; J. Bagger; Supersymmetry and supergravity (Princeton University Press 1992)