Module: Elective Advanced Lectures: Theoretical Physics

Module No.: physics70c

Course: Effective Field Theory (T)

Course No.: physics757

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

Requirements for Participation:

Preparation:
Advanced quantum theory (physics606)
Quantum Field Theory (physics755)

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

Length of Course:
1 semester

Aims of the Course:
Understanding basic properties and construction of Effective Field Theories, ability to perform calculations in Effective Field Theories

Contents of the Course:
Scales in physical systems, naturalness
Effective Quantum Field Theories
Renormalization Group, Universality
Construction of Effective Field Theories
Applications: effective field theories for physics beyond the Standard Model, heavy quarks, chiral dynamics, low-energy nuclear physics, ultracold atoms

Recommended Literature:
S. Weinberg; The Quantum Theory of Fields (Cambridge University Press 1995)
J.F. Donoghue et al.; Dynamics of the Standard Model (Cambridge University Press 1994)
A.V. Manohar, M.B. Wise; Heavy Quark Physics (Cambridge University Press 2007)
P. Ramond, Journeys Beyond The Standard Model (Westview Press 2003)
D.B. Kaplan, Effective Field Theories (arXiv:nucl-th/9506035)
E. Braaten, H.-W. Hammer; Universality in Few-Body Systems with Large Scattering Length (Phys. Rep. 428 (2006) 259)