



Universität Regensburg

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Theoretische Physik, Lst. Schäfer/Bali/Pleiter

Vorlesungsankündigung

Wintersemester 2017/18

Lattice QCD I

Veranstaltungs-Nr. 52444(Vorlesung), 52445 (Übung), 52446 (Computer lab)

Lectures: Mo, Fr 10-12 c.t., PHY 4.1.12

Exercise Class: Fr 12-14 c.t., PHY 1.0.02

Catch-up Computer Lab: Di 16-18 c.t., PHY 9.2.08 (optional)

Start: **Monday 16.10., 10:15 Uhr, PHY 4.1.12**

In particle physics one encounters strongly interacting non-linear systems that cannot be solved analytically. Prominent examples of this are the bound state properties of Quantum Chromo Dynamics (QCD), the theory of quarks and gluons. This lecture course will introduce the lattice regularisation of this theory and the Monte Carlo methods which enable the simulation and extraction of physical properties. Pure gauge theories as well as theories including fermions will be studied.

This course is aimed at M.Sc. and PhD students with an interest in particle physics and/or Monte Carlo simulations. Knowledge of Quantum Electrodynamics is advantageous but not essential.

Note, that the Lattice QCD I course can be taken as an **alternative** to the QCD lectures (Veranstaltungs-Nr. 52416, Prof. Braun).

The exercise class will involve simulating QCD and calculating some typical observables. Initially, you will be expected to write your own programs for simulating simpler systems: the harmonic oscillator in 1 dimension and scalar field theory in 2+1 dimensions. For QCD an existing software package will be used. Basic programming skills in, e.g., C/C++, are necessary.

Hinweis: Kenntnisse in C/C++ können auch im Vorfeld in der Blockveranstaltung „Programmieren in C/C++“, Nr: 52801, 11.9.-22.09.2016 erworben werden.