

SYNU 1: From QCD to Nuclei

Zeit: Dienstag 9:00–10:50

Raum: S1/01 A1

Plenarvortrag SYNU 1.1 Di 9:00 S1/01 A1
Few Nucleon Systems from Lattice QCD — •MARTIN SAVAGE
— Institute for Nuclear Theory, Seattle, Washington, USA

Remarkable progress is being made in using the numerical technique of lattice QCD to explore simple properties of light nuclei directly from the underlying theory of the strong interactions. After a brief introduction, I will present the status of lattice QCD calculations of few nucleon systems, including the magnetic moments and polarizabilities of light nuclei, and the cross section for the radiative capture process $n+p$ to $d+\gamma$. I will also present some new results for these light systems.

Plenarvortrag SYNU 1.2 Di 9:45 S1/01 A1
Uncertainty quantification and nuclear forces — •RICHARD
FURNSTAHL — Ohio State University, Columbus, OH, USA

Rapid improvements in many-body methods for nuclear structure and reactions are enabling new confrontations with data from present and future experiments, which include precise and reliable mass measure-

ments, explorations to the limits of nuclear existence, and studies of fundamental symmetries and neutrinos. These confrontations require robust theoretical uncertainty quantification (UQ). Increasingly, a dominant source of uncertainty is the input Hamiltonian. This is spurring improvements to the chiral effective field theory (ChEFT) of nuclear forces, which seeks a faithful low-energy representation of quantum chromodynamics in the form of a controlled expansion. The error in a calculated observable from omitted higher-order terms in the ChEFT expansion is an example of a systematic theory uncertainty. I will survey recent developments and future prospects for the formulation and optimization of chiral nuclear forces and related advances in theoretical UQ, including the application of Bayesian parameter estimation and model selection.

Grußworte von dem Präsidenten der TU Darmstadt, Professor Dr. Hans Jürgen Prömel, sowie von Staatssekretär Ingmar Jung aus dem Hessischen Ministerium für Wissenschaft und Kunst.