

NUCLEAR PHYSICS FROM THE GROUND UP

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At its core, nuclear physics, arises from the Standard Model. However, the complexities of nuclei result in severe computational difficulties that have historically prevented the calculation of central quantities in nuclear physics directly from this underlying theory. The availability of petascale (and prospect of exascale) high performance computing is changing this situation by enabling us to extend the numerical techniques of lattice Quantum Chromodynamics (LQCD), applied successfully in particle physics, to the more intricate dynamics of nuclear physics. In this talk, I will discuss this revolution and the emerging understanding of hadrons and nuclei within the Standard Model. In particular I will discuss the spectroscopy of light nuclei as well as studies of their interactions and structure.