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Lattice QCD in the exascale computing era

Lattice QCD is the leading framework for systematically studying the non-perturbative regime of Quantum Chromodynamics (QCD), the theory of strong interactions. Today, lattice methods are essential for high-precision calculations—both current and future—of fundamental quantities in the Standard Model of particle physics. These advancements are made possible by highly-parallelized HPC simulations, driven by ongoing research into new algorithms informed by physics. Modern implementations can utilize up to 100 000 CPU cores or 1000 GPUs in parallel, running on pre-exascale systems with near-ideal scalability.

Giorno preferito

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Primary author: Dr CÈ, Marco (Università di Milano-Bicocca)

Presenter: Dr CÈ, Marco (Università di Milano-Bicocca)