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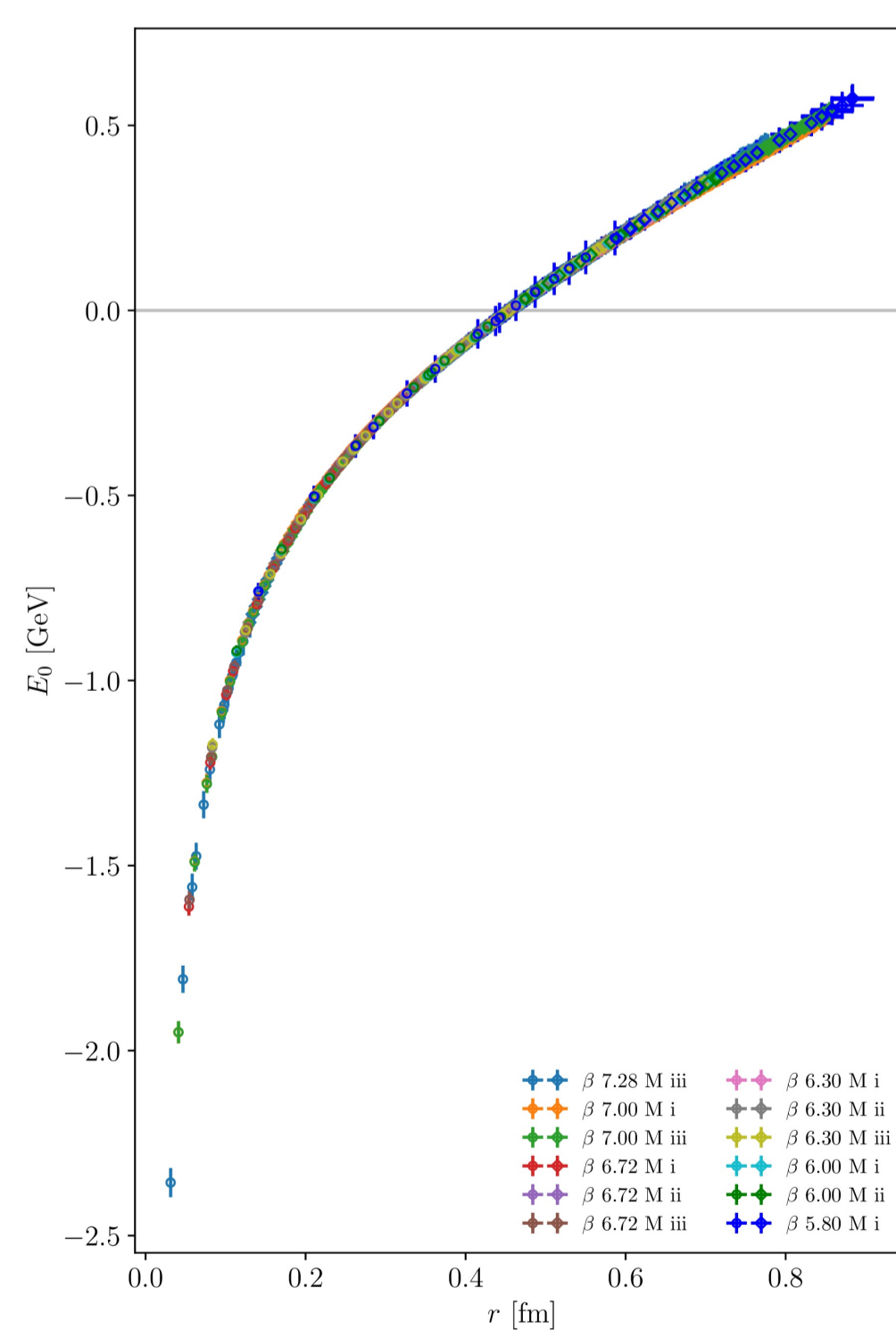
Lattice QCD: from Promise to Precision

physikalisches

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Ort: H34

Within the Standard Model of particle physics, quantum chromodynamics (QCD, the theory of the strong force) is unique in several ways. It is a beautiful quantum field theory, consistent at all energies, all temperatures, and all densities. It is rich in emergent phenomena, which is a more challenging kind of beauty when quantitative understanding is needed.

By now, however, several “incalculable” QCD properties have been calculated with sub-percent precision, thanks to numerical lattice gauge theory. In this colloquium, I trace this subject’s journey from a promising technique to a precise and predictive tool, relied on to interpret experiments in particle physics, nuclear physics, and even astrophysics.



Total energy stored between a heavy quark and antiquark as a function of separation distance, computed with lattice QCD. From <https://doi.org/10.1103/PhysRevD.107.074503>.