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From Qubits to Quarks: Parton Physics on a Quantum Computer

SCOTT LAWRENCE, University of Maryland, College Park, NUQS COLLABORATION — Quantum computers provide a unique way of computing real-time correlators from first principles, a task not yet achievable on classical computers due to the sign problem. The determination of parton distribution functions on the euclidean lattice is obstructed by an inability to properly calculate real-time correlators. This is a match made in heaven: a lattice field theory simulation on a quantum computer may provide access to PDFs. In this talk we outline recent progress on simulating field theories on a quantum computer, and show how this progress may be leveraged to obtain PDFs.

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