

“The Hadronic Window to the Standard Model and Beyond”

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Abstract

The Standard Model of particle physics is a fantastically successful theory. Nevertheless, it is known to be incomplete both observationally and theoretically. Experimental measurements in quark-flavor physics offer tantalizing hints of possible physics beyond the Standard Model. At the same time, upcoming measurements (e.g., at DUNE) are expected to transform our knowledge of neutrinos and may perhaps uncover new physics. Both areas face a common challenge: developing a precise theoretical understanding of hadronic physics grounded in the Standard Model. This talk will describe recent and ongoing work to develop such an understanding, primarily using lattice quantum chromodynamics (QCD). Research in lattice QCD sits at the intersection of quantum field theory, computational physics, and data science. The talk will also sketch connections to these different areas.

Biography

William Jay (MIT) is a postdoctoral researcher working in theoretical particle physics. Dr. Jay completed his graduate education at the University of Cambridge (MASt, 2013) and the University of Colorado Boulder (PhD, 2018), after which he spent three years as a postdoc in the theory group at Fermilab (2018-2021). He has been a postdoc at MIT since 2021. His main research interest is hadronic physics in the search for physics beyond the Standard Model, primarily using lattice QCD. He is also developing a Monte Carlo event generator to provide theoretical support of the accelerator-based neutrino program. His research interests sit at the intersection of theoretical physics, computational physics, and data science.