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Taming Excited-state Contributions to Matrix Elements of Boosted Hadrons COLIN EGERER, JOE KARPIE, William and Mary, RAZA SUFIAN, DAVID RICHARDS, KOSTAS ORGINOS, JIANWEI QIU, ROBERT EDWARDS, BALINT JOO, FRANK WINTER, Thomas Jefferson National Accelerator Facility, TANJIB KHAN, William and Mary — Lattice gauge field calculations provide an ab initio method to non-perturbatively study strongly-coupled theories, such as Quantum Chromodynamics (QCD), with controllable systematics. However due to the strong coupling characteristic of low-energy QCD, any operator used to interpolate a hadronic state from the vacuum is a best-guess and necessarily couples to all single and multi-particle states in the same symmetry channel. Spatial smearing and variational methods to improve operator-state overlaps are two well-established methods that facilitate the study of ground-state hadronic properties in lattice QCD. Overcoming excited-state contamination and a degrading signal-to-noise ratio becomes a formidable task as a hadron's momentum is increased. In this presentation we discuss a modification of distillation, an efficient type of smearing, which when combined with the variational method leads to a particularly powerful prescription that not only separates ground- and excited-states to high precision, but continues to do so for large lattice momenta. This development is of particular importance to the many lattice efforts seeking to determine parton distributions, form factors (FFs) and transition FFs, for which high momenta is an essential ingredient.

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