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Lattice QCD and the search for new physics using beauty quarks

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One of the most promising ways of searching for physics beyond the Standard Model is the precision study of processes in which quarks change their flavor through the weak interaction. Such processes are sensitive to quantum effects of new elementary particles that are too heavy to be produced directly in high-energy collisions. The challenge is that quarks are strongly interacting with gluons and are bound inside hadrons. To search for new physics in hadronic processes, the effects of the strong interactions need to be calculated using lattice QCD, a numerical method requiring supercomputers. In this talk I will give an introduction to lattice QCD, and discuss its application to decays of beauty quarks. For these decays there are currently some deviations between calculations and experimental measurements, which may be hints of physics beyond the Standard Model.