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Lattice QCD and physics beyond the Standar Model: an experimentalist perspective[1]

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The new frontier in elementary particle physics is to find evidence for new physics that may lead to a deeper understanding of observations such as the baryon-antibaryon asymmetry of the universe, mass hierarchy, dark matter, or dark energy to name a few. Flavor physics provides a wealth of opportunities to find such signatures, and a vast body of data taken at e^+e^- b-factories and at hadron machines has provided valuable information, and a few tantalizing "tensions" with respect to the Standard Model predictions. While the window for new physics is still open, the chance that its manifestations will be subtle is very real. A vibrant experimental program is ongoing, and significant upgrades, such as the upgraded LHCb experiment at LHC and Belle 2 at KEKb, are imminent. One of the challenges in extracting new physics from flavor physics data is the need to relate observed hadron decays to fundamental particles and interactions. The continuous improvement of Lattice QCD predictions is a key element to achieve success in this quest. Improvements in algorithms and hardware have led to predictions of increasing precision on several fundamental matrix elements, and the continuous breaking of new grounds, thus allowing a broader spectrum of measurements to become relevant to this quest. An important aspect of the experiment-lattice synergy is a comparison between lattice predictions with experiment for a variety of hadronic quantities. This talk summarizes current synergies between lattice QCD theory and flavor physics experiments, and gives some highlights of expectations from future upgrades.

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