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Revisiting B->K nu nu decays in the SM and beyond

Tuesday, 11 April 2023 15:36 (22 minutes)

In this talk, I will revisit the Standard Model (SM) predictions for $\mathcal{B}(B \to K^{(*)}\nu\bar{\nu})$ and discuss the opportunities that open up when combining its partial decay with that of $\mathcal{B}(B \to K^{(*)}\mu\mu)$. I will argue that the differential measurement of $B \to K\nu\bar{\nu}$ decays allow for an useful cross-check of the shape of the vector form-factor ($f_+(q^2)$), which is only computed at high-q^2 on the lattice and extrapolated to the physical region. I will then show that the ratios $\mathcal{B}(B \to K^{(*)}\mu\mu)/\mathcal{B}(B \to K^{(*)}\nu\bar{\nu})$ allow for a clean extraction of $C_9^{\mu\mu}$, which is independent of the $B \to K^{(*)}$ form-factors to a first approximation. Lastly, I will show that the same ratio also proves to be more sensitive to the presence of New Physics in many plausible extensions of the SM.

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