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Sifting through the Standard Model for the hints of an ALP

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Flavor experiments commissioned to provide precise measurements of the Standard Model (SM) parameters are excellent laboratories to look for hypothesised particles, especially those with masses less than a GeV. In this talk, I discuss some experiments related to semi-leptonic charged current amplitudes, which can be veritable smoking guns for axion-like particles (ALPs). I show that the bounds obtained from such an exercise are only loosely sensitive to the mass of the ALP. I discuss results from NA48/2, Belle, and BaBar and also discuss how Belle-II projected sensitivities for tau to K decays can give bounds on the Wilson-coefficient space stronger than existing ones. I also discuss sum-rules arising from the modifications to chiral perturbation theory in the presence of an ALP, a framework that we have used to derive the results.

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