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Flavourful axion phenomenology

Sunday 3 February 2019 15:00 (30 minutes)

We provide a comprehensive discussion of the phenomenology of flavourful axions, including both standard Peccei-Quinn (PQ) axions, associated with the solution to the strong CP problem, and non-standard axion-like particles (ALPs). Presenting the general flavourful axion-fermion and axion-photon coupling, we calculate flavour-violating decays of mesons and leptons involving a flavourful axion. We also derive the mixing between axions and mesons which affects the meson oscillation probability and mass difference, and also contributes to meson decays into axions and axion decays into two photons. These effects may be relevant for ALPs. Finally we describe the phenomenology of a particular "A to Z" Pati-Salam model, in which PQ symmetry arises accidentally due to discrete flavour symmetry. Here all axion couplings are fixed by a fit to flavour data, leading to sharp predictions and correlations between flavour-dependent observables.

Primary author: Prof. EUNG JIN CHUN (ejchun@kias.re.kr)

Presenter: Prof. EUNG JIN CHUN (ejchun@kias.re.kr)

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