Contribution ID: **30** Type: **not specified**

Axion quality from flavour gauge symmetries

Wednesday 9 June 2021 08:50 (25 minutes)

The strong CP problem is elegantly solved by the Peccei-Quinn (PQ) mechanism, that postulates the existence of a global Abelian symmetry endowed with a mixed □(1)□□-□□(3)□ anomaly, and broken spontaneously. Implementing the PQ mechanism in UV complete models poses some challenges: (i) being anomalous, the PQ symmetry cannot be fundamental, so which is its origin? (ii) being global, it is not respected by quantum gravity corrections, so how can it remain protected? I will argue that a class of local gauge groups can automatically produce PQ symmetries with the required level of protection. Within the standard model, these symmetries would play the role of flavour symmetries, providing interesting connections between the axion quality problem and the flavour puzzle.

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Session Classification: MOCa