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The Axion-Flavor connection

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A local flavor symmetry acting on the quarks of the Standard Model can automatically give rise to an accidental global $U(1)$ symmetry which remains preserved from sources of explicit breaking up to a large operator dimension, while it gets spontaneously broken together with the flavor symmetry. Such non-fundamental symmetries are often endowed with a mixed QCD anomaly, so that the strong CP problem is automatically solved via the axion mechanism.
As a bonus, local flavor symmetries can also help to explain the observed pattern of quark masses and intergenerational mixings, providing an intriguing *axion-flavor connection*.
We illustrate the general features required to realise this scenario, and we discuss a simple construction based on the *flavor* group $SU(3) \times SU(2) \times U(1)$ to illustrate how mass hierarchies and intergenerational mixings can arise while ensuring at the same time a high quality Peccei-Quinn symmetry.

Summary

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