

Accidental quality axion from gauged flavor symmetry

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The axion solution to the strong CP problem is closely entwined with the flavor structure of the standard model. So our model attempts at explaining the Flavor puzzle through the a gauged abelian Froggatt Nielsen mechanism and thereby automatically end up with a “quality axion” as the result of a residual anomalous $U(1)_{PQ}$ symmetry. This is achieved in a DFSZ like scenario with a “Flavon” field of the gauged $U(1)_F$ in addition to the PQ scalar. Demanding favorable mass textures, the charges we require to cancel the anomalies naturally provide us an accidental quality axion. Such models provide us with various probes like flavor violating axion couplings, axion DM production and gravitational waves from the decay of domain walls facilitated by the explicit $U(1)_{PQ}$ breaking terms.

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