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Flavour phenomenology and collider signatures of the flavon of $\mathcal{Z}_{\rm N} \times \mathcal{Z}_{\rm M}$ flavour symmetry

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We investigate the flavour and collider phenomenology of the flavon of the novel and unique $\mathcal{Z}_{\rm N} \times \mathcal{Z}_{\rm M}$ flavour symmetry, which is capable of addressing the flavour problem of the standard model through the Froggatt-Nielsen (FN) mechanism. In addition to the conventional approach relying on soft-symmetry breaking of the $\mathcal{Z}_{\rm N} \times \mathcal{Z}_{\rm M}$ flavour symmetry, we employ a novel symmetry-conserving mass mechanism for the axial flavon to explore its phenomenology. We first examine the constraints on the flavon parameter space using current and projected measurements of various quark and leptonic flavour violating observables. Furthermore, we analyze the characteristic collider signatures of the flavon of the different $\mathcal{Z}_{\rm N} \times \mathcal{Z}_{\rm M}$ flavour symmetries through its decay and production channels, discussing the accessibility of these signatures to the reach of the high-luminosity LHC, high energy LHC, and a 100 TeV collider.

Track type

Flavour Physics

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