

FLASY 2025 - 11th Workshop on Flavour Symmetries and Consequences in Accelerators and Cosmology



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Axion framework with colour-mediated Dirac neutrino masses

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I will discuss our recent paper [arXiv:2501.13156](https://arxiv.org/abs/2501.13156) where we propose a KSVZ-type axion framework in which vector-like quarks (VLQ) and coloured scalars generate Dirac neutrino masses radiatively. The global Peccei-Quinn symmetry (under which the exotic fermions are charged) addresses the strong CP problem and ensures the Dirac nature of neutrinos. The axion also accounts for the observed cosmological dark matter. We systematically explore all viable VLQ representations. Depending on the specific scenario, the framework predicts distinct axion-to-photon couplings, testable through haloscope and helioscope experiments, as well as potentially significant flavor-violating quark-axion interactions.

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