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Theory of Baryon and Lepton Number Violation

Saturday, 27 September 2025 09:00 (30 minutes)

We propose new axion models in which the Peccei–Quinn (PQ) symmetry is identified with baryon and/or lepton number symmetries. By extending the KSVZ axion model with higher- dimensional operators, we develop a general method to fix the baryon and lepton numbers of new scalar fields. This framework naturally predicts distinctive baryon-number violating processes such as nucleon decays, neutron–antineutron oscillations, and di-nucleon decays.
We present UV-complete examples and show that their predicted rates can be probed by current experiments such as Super-Kamiokande and Hyper-Kamiokande, as well as future dedicated searches for neutron–antineutron oscillations.

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