

An EFT mechanism for exact proton stability

Wednesday 4 June 2025 09:00 (25 minutes)

We propose a model in which the proton is rendered absolutely stable by an IR mechanism that remains robust against unknown quantum gravity effects. An anomaly-free linear combination of baryon number and lepton flavors is gauged and spontaneously broken to a residual Z_9 discrete gauge symmetry, enforcing a strict selection rule in the SMEFT: baryon number violation occurs only in multiples of three. Despite its minimal field content—a single $U(1)$ gauge group, three right-handed neutrinos for anomaly cancellation, and two SM-singlet scalars for symmetry breaking—the model successfully accounts for established empirical evidence of physics beyond the SM: neutrino masses and mixings, dark matter, and the baryon asymmetry of the universe.

Presenter: GRELJO, Admir (Universitaet Basel (CH))

Session Classification: Flavour Symmetries / Neutrinos