

# Improved Limits on Lepton-Flavor-Violating Decays of Light Pseudoscalars via Spin-Dependent $\mu \rightarrow e$ Conversion in Nuclei

Lepton-flavor-violating decays of light pseudoscalars,  $P = \pi^0, \eta, \eta' \rightarrow \mu e$ , are stringently suppressed in the Standard Model up to tiny contributions from neutrino oscillations, so that their observation would be a clear indication for physics beyond the Standard Model.

However, in effective field theory such decays proceed via axial-vector, pseudoscalar, or gluonic operators, which are, at the same time, probed in spin-dependent  $\mu \rightarrow e$  conversion in nuclei.

We derive master formulae that connect both processes in a model-independent way in terms of Wilson coefficients, which in the case of  $\mu \rightarrow e$  conversion in nuclei requires input for the nuclear matrix elements including the charge density to account for the bound-state physics, and study the implications of current  $\mu \rightarrow e$  limits in titanium for the  $P \rightarrow \mu e$  decays. We find that these indirect limits surpass direct ones by many orders of magnitude.

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**Primary authors:** Prof. HOFERICHTER, Martin (University of Bern); MENÉNDEZ, Javier (University of Barcelona); NOËL, Frederic (ITP, AEC, Uni Bern)

**Presenter:** NOËL, Frederic (ITP, AEC, Uni Bern)

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