

Charged-meson-induced new physics in beam-focused neutrino experiments

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We point out that the production of new bosons by charged meson decays can greatly enhance the sensitivity of beam-focused accelerator-based experiments to new physics signals. This enhancement arises since the charged mesons are focused and their three-body decays do not suffer from helicity suppression in the same way as their usual two-body decays. As a realistic application, we attempt to explain the MiniBooNE low energy excess utilizing this overlooked mechanism, uniquely realizing dark-sector interpretations as plausible solutions to the excess. For illustration purposes, we consider two well-motivated classes of dark-sector models, models of vector-portal dark matter and models of long-lived (pseudo)scalar. We argue that the model parameter values to accommodate the excess are consistent with existing limits and that they can be tested at current and future accelerator-based neutrino experiments.

Attendance type

In-person presentation

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