

The logo for DPF-PHENO 2024 features the text "DPF-PHENO 2024" in a bold, sans-serif font. The text is white and set against a blue background that has a subtle, light-colored cloud-like pattern.

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The New Physics Case for Beam-Dump Experiments with Accelerated Muon Beams

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As the field examines a future muon collider as a possible successor to the LHC, we must consider how to fully utilize not only the high-energy particle collisions, but also any lower-energy staging facilities necessary in the R&D process. An economical and efficient possibility is to use the accelerated muon beam from either the full experiment or from cooling and acceleration tests in beam-dump experiments. Beam-dump experiments are complementary to the main collider as they achieve sensitivity to very small couplings with minimal instrumentation. We demonstrate the utility of muon beam-dump experiments for new physics searches at energies from 10 GeV to 5 TeV. We find that, even at low energies like those accessible at staging or demonstrator facilities, it is possible to probe new regions of parameter space for a variety of generic BSM models, including muonphilic, leptophilic, $L\mu-L\tau$, and dark photon scenarios. Such experiments could therefore provide opportunities for discovery of new physics well before the completion of the full multi-TeV collider.

Mini Symposia (Invited Talks Only)

Primary author: GAMBHIR, Rikab (MIT)

Co-author: CESAROTTI, Cari

Presenter: GAMBHIR, Rikab (MIT)

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