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Simulation studies and design updates for the nuSTORM facility

Monday 2 June 2025 16:00 (2 hours)

The nutrinos from Stored Muons (nuSTORM) experiment aims to create neutrino beams through muon decay in a storage ring, targeting %-level precision in flux determination. With access to two neutrino flavors, it enables precise measurement of nu-A cross sections and exhibits sensitivity to Beyond Standard Model (BSM) physics. With muons in the 1-6 GeV/c momentum range, it covers neutrino energy regimes relevant to experiments like DUNE and T2HK. Additionally, nuSTORM serves as a step towards a muon collider, a proof of concept for storage rings, and a test for beam monitoring and magnet technologies. The lattice structure consists of a pion transport line and a racetrack storage ring based on a hybrid FFA design, with conventional FODO cells in the production straight combined with FFA cells in the return straight and arcs. This paper provides an update on the nuSTORM design and simulation efforts. It covers horn and lattice optimizations for producing and storing low-energy muons, and describes tracking studies of the lattice to guide event normalization and highlights detector sensitivity studies performed using GENIE and NUISANCE.

Footnotes

Paper preparation format

LaTeX

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