

12th Beam Telescopes and Test Beams Workshop



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Physics Opportunities and Challenges at Future Multi-TeV Muon Collider

Thursday, April 18, 2024 9:00 AM (1 hour)

A multi-TeV muon collider represents an extraordinary opportunity for groundbreaking discoveries and precise Standard Model measurements. By colliding muons, the entire center-of-mass energy becomes available for high-energy reactions, allowing for the exploration of extremely short length scales. Additionally, multi-TeV muons have a high probability of emitting electroweak radiation, effectively transforming the muon collider into a vector boson collider and opening new path for studying electroweak physics.

However, muons being unstable particles, present several significant challenges for both the accelerator and the detector. Protective measures are necessary to shield both of them from the high fluxes of particles generated by muon decay products interacting with infrastructure components. Furthermore, the development of a new method for beam cooling is essential since traditional techniques are designed for use with stable particles. An extensive R&D program has been defined to address these technological challenges.

The lecture will offer insights into the primary physics potentials alongside the associated experimental challenges, and it will provide an overview of the status of the collider facility.

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