



Contribution ID: 15 Contribution code: THPT17

Type: **Poster Presentation**

Design of 6D Cooling and Final Cooling Channels for a Muon Collider

Thursday, October 23, 2025 5:10 PM (20 minutes)

The muon collider is a promising candidate for exploring new physics at the energy frontier, offering the advantages of lepton collisions at multi-TeV scales. Achieving high luminosity requires reducing the six-dimensional (6D) emittance of the muon beam by several orders of magnitude within the muons' limited lifetime. This is accomplished through ionization cooling, which involves two main stages: initial 6D cooling and final transverse cooling. This paper presents an updated lattice design for both rectilinear 6D cooling and final cooling. The latest design achieves a factor of two reduction in final transverse emittance, marking a significant advancement toward meeting the beam quality requirements of a future muon collider.

Footnotes

Funding Agency

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Yes

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Session Classification: THPT poster session

Track Classification: WGB:Beam Dynamics in Linacs