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Optimizing initial beam parameters for efficient muon ionization cooling

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Ionization cooling is only cooling technique capable of efficiently reducing the phase space of a muon beam within a short timeframe. The ultimate cooling phase of a muon collider aims to minimize transverse emittance while simultaneously curbing longitudinal emittance growth, to achieve optimal luminosities within the collider ring. This study shows that achieving efficient cooling performance requires selecting the best initial muon beam parameters. We present a technique that enables the determination of these optimal initial parameters through simulations and compare them with analytical models.

Footnotes

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Europe

Primary author: STECHAUNER, Bernd (European Organization for Nuclear Research)

Co-authors: FOL, Elena (European Organization for Nuclear Research); ROGERS, Chris (Science and Technology Facilities Council); SCHIECK, Jochen (Austrian Academy of Sciences); SCHULTE, Daniel (European Organization for Nuclear Research)

Presenter: STECHAUNER, Bernd (European Organization for Nuclear Research)

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