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Update of the PLACET2 code for the low-energy acceleration stages of the muon collider

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This work describes improvements made to the tracking code PLACET2 to make it possible to simulate the acceleration from 250 MeV to 63 GeV in a future muon collider. This software was selected because of its unique ability to optimally simulate recirculating linacs, which are part of the proposed layout for this initial muon acceleration stage. PLACET2 has been updated to simulate non-relativistic particles and to consider particle beams of different species, charges and masses. The main changes were introduced in the longitudinal dynamics, synchrotron radiation and wakefield descriptions. In addition, the decay of particles has been added as a new feature. The changes were benchmarked in different tests against RF-Track, a code able to simulate low energy muon beams and their decay. Finally, the lattice of the 16.6 GeV arc in the initial acceleration stage of the muon collider was simulated with both PLACET2 and RF-Track, providing another test. All the results showed excellent agreement between both codes, verifying the implementation in PLACET2.

Footnotes

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Europe

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