Contribution ID: **96** Type: **Poster**

Low emittance muon beam in the 2 to 40 GeV energy range for muon and neutrino experiments

I present a scheme to obtain a 2 to 40 GeV low emittance muon beam, not requiring cooling and within today's technological resources, to be used for early commissioning of muon accelerator projects, or alternatively dedicated muon and neutrino parameter measurements. In particular, a muon rate of 5x10ˆ4 mu/s in a normalized transverse emittance of 5 um at 22 GeV, and energy spread of 1 GeV obtained from O(10ˆ11) e+/s on target at 44 GeV. This emittance is below the expected results of advanced emittance cooling techniques for muons produced from protons-on-target, and represents an alternative for the duration of complete muon cooling studies. The scheme has beam designed to adjust the muon beam energy in the GeV energy range to the needs for precise parameter measurements of muons and neutrinos. Although the rate is small compared to other muon sources, it does not seem to represent a big limitation for its usage. Furthermore, the muon rate could be in principle increased proportionally to the availability of higher positron rates, already foreseen for future collider projects.

Working group

WG3

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Session Classification: Poster session NB: do not use Safari; use Firefox, Chrome or Edge