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Design of a Microbunched Electron Cooler Energy Recovery Linac

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Microbunched electron Cooling (MBEC), a type of Coherent electron Cooling (CeC), is a possible way to cool high energy protons; such an electron cooler can be driven by an energy recovery linac (ERL). The beam parameters of this design are based on cooling 275 and 100 GeV protons at the Electron-Ion Collider (EIC), requiring 150 and 55 MeV electrons, respectively. If implemented, a high energy cooler would serve to increase the average luminosity of the collider by mitigating the emittance growth caused by various processes. This ERL is designed to deliver a bunch charge of 1 nC, an average current of 100 mA, and strict requirements on the transverse emittance, slice energy spread, and longitudinal distribution profile. This paper covers the current state of the design.

Footnotes

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