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Generation of Magneto-Immersed Electron Beams

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There are many applications of electron beams in accelerator facilities: for electron coolers, electron lenses, and electron beam ion sources (EBIS) to mention a few. Most of these applications require magnetic compression of the electron beams to reduce the radius of the electron beam with goal to either match the circulating ion beam (electron lenses and electron coolers) or to increase ionization capability for production of highly charged ions (EBIS). The magnetic compression of the electron beam comes at a cost of increasing the share of transverse energy and therefore the angles of electron trajectories with the longitudinal axis. Considering the effect of magnetic mirror it is highly desirable to produce a laminar electron beam in the electron gun. Analysis of electron guns with different configurations is given with emphasis on generating laminar electron beams.

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