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Beam Diagnostics

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The working principle of frequently used beam instruments for electron and proton beams concerning the transverse and longitudinal profile measurement is discussed. A large variety of monitors for transverse profile measurement exists, based on the energy loss of the beam particles in matter followed by the detection of secondary particles or photons (SEM-Grids, wire scanners, scintillation screens, optical transition radiation screens, ionization profile monitors). Based on profile measurements, the beam emittance at transfer lines can be deduced by several methods. The bunch shape is determined with several methods, either based on the broadband measurement of the bunch electric field, by electro-optical techniques or related to the emission of synchrotron photons.

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