

Electron Beam Transverse Emittance Measurement using Optical Transition Radiation Interferometry,
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CEA-BIII/SPTN, Bruyères-le-Châtel - We report on measurements of the ELSA electron beam transverse emittance obtained by exploiting the optical transition radiation (OTR) properties. The experiment was achieved with a beam of 10-20 ps bunch duration, 0.2 to 5 nC bunch charge and 16.5 MeV energy. Beam profile and OTR light angular distribution were measured in successive sequences by means of an interferometer. It consists of an 8 μm Kapton foil followed by a 80 μm Si wafer used as a mirror. The spacing between foil and wafer is 1.6 mm. Beam divergence is obtained from a least square fitting of the interference pattern data with an OTR distribution function in which the varying parameters are the beam energy and angular spread. This technique yields the transverse emittance, provided that the measured profile corresponds to a beam waist. Concurrently, measurements using both the quad-scan technique and the single OTR foil method have been performed. Results obtained by the three methods are presented and their performances discussed.