

Proposed Emittance Measurement at AmPS and DELTA using Laser Compton Scattering,
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N. MARQUARDT, DELTA - The proposed non-destructive method for determining the electron beam transverse emittance at the Amsterdam Pulse Stretcher (AmPS) and the Dortmund Electron Test Accelerator (DELTA) is described. The emittance will be derived from measurements of the beta functions and the electron beam transverse profile. Monitoring of the horizontal and vertical tune shifts by wobbling one of the machine quadrupoles will provide the beta functions. The beam profile will be obtained by scanning a focused pulsed laser beam under 90° over the electron beam, and counting the Compton scattered photons downstream from the interaction point. This method has been chosen because of the comparatively small beam sizes at which diagnostics by means of synchrotron radiation are no longer applicable, and the wide range of up to two orders of magnitude needed to be covered. At present estimated beam size at AmPS is in the order of fraction of 1 mm. In the near future vertical beam sizes below 100 μm are expected for both AmPS and DELTA.