Joint DESY and University of Hamburg Accelerator Physics Seminar

Tuesday, November 15, 2005

(16:00 in Room 459/30b)

Design optimisation of the Emittance Measurement System to be used in PITZ 2

Lazar Staykov

DESY

Abstract

The photo injector test facility at DESY Zeuthen (PITZ) has been built to test and to optimize electron sources for Free Electron Lasers (FEL's). In order to study the emittance conservation principle, further acceleration is required. To increase the electron beam energy up to 30 MeV, a CDS type accelerating booster cavity[1] is under development. Extended beam dynamics simulations show that the projected normalized transverse emittance can be less than 1 mm mrad [2]. To measure such small emittance, an upgrade of the existing Emittance Measurement SYstem (EMSY) is required. EMSY uses the slit mask technique to determine the beam emittance. In this paper, considerations on the physics of the system as well as results from GEANT4 simulations are given. The expected signal to noise ratio, the resolution of the system, and the energy deposition in the slit–mask are estimated. EMSY was constructed in INRNE Sofia. Installation and first results are expected by the end of this year.

D.P.Barber (MPY), J.Rossbach (Univ. HH) and M.Vogt (MPY).

Visit our web site at `http://www-mpy.desy.de/AccPhySemDESY/`

[1] V. Paramonov et al., "Design parameters of the normal conducting booster cavity for the PITZ-2 test stand", LINAC 2004, Luebeck Germany.

[2] M. Krasilnikov et al., "Recent developments at PITZ", PAC'05, May 2005, Tennesy USA.