

Multi-cell RF Injectors Driven by Thermoionic Cathodes, M. FERRARIO, INFN-LNF; L. SERAFINI, INFN-MILANO - Long Wavelength FELs in the FIR range run in the SASE mode (single pass high gain starting from noise) need beam currents in excess of 100 A with moderate normalized transverse emittances (<50 mm.mrad). In this paper we analyze the performances of a multi-cell RF injector of the Plane Wave Transformer type [1] run with a thermoionic cathode: a full energy beam at 10 MeV can be generated meeting the FEL requirements via an energy selection in a chicane magnetic compressor. As discussed in the paper this choice offers a much cheaper solution than an equivalent laser driven photoinjector. The perspectives on the achievement of even better performances, in terms of beam brightness, are also presented, showing some interesting implications even for shorter wavelength FELs.

- [1] J.B. Rosenzweig et al., "Beam Dynamics in an Integrated Plane Wave Trans. Photoinjector at S- and X-band", Proc. of Particle Accelerator Conference, May 1997, Vancouver, Canada.