

## مقاله نامه بیست و دومین کنفرانس بهاره فیزیک (۳۱-۳۰ اردیبهشت ۱۳۹۴)

### **Beam Matching to the CERN Linac4 Drift Tube Linac during the beam commissioning at 3 MeV**

M. Yarmohammadi Satri<sup>1,2</sup>, M. Lamehi-Rachti<sup>1</sup>

<sup>1</sup> IPM, Tehran, Iran

<sup>2</sup> CERN, Geneva, Switzerland

#### Abstract

Linac4 is a 160 MeV  $H^-$  linear accelerator, the injector to the CERN Proton Synchrotron Booster. It is presently under construction at CERN and will replace the present 50 MeV proton Linac2 as part of a project to increase the LHC luminosity. The Linac4 front-end, composed of a 45 keV ion source, a Low Energy Beam Transport (LEBT), a 352.2 MHz Radio Frequency Quadrupole (RFQ) which accelerates the beam to 3 MeV, a Medium Energy Beam Transport (MEBT) housing a beam chopper, and the first Drift Tube Linac (DTL) tank at 12 MeV have been commissioned during the 2014. The MEBT is composed of three RF cavities and 11 quadrupole magnets to deliver and match the beam from the RFQ to the next accelerating structure (DTL). The DTL beam matching parameter and the MEBT components value were discovered by the simulation codes. These were crucial for a successful beam matching to the DTL and well complimented with the transverse emittance measurement taken with a temporary slit-and-grid emittance measurement device located after the MEBT.