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A High Voltage DC GUN for a High Brightness Beams Test Facility

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HB2TF is a project funded by INFN CSN5 related to the development of a High Brightness Beams Test Facility (HB2TF) at the INFN-LASA laboratory. The Test Facility will allow to perform developments in different accelerator technologies and to carry out experiments with a high current CW electron beam in frontier areas of accelerator physics.

The Test Facility setup will comprise a high-performance DC Gun followed by a normal conducting RF buncher-acceleration section to provide 1 MeV 5 mA CW electron beam.

A HV DC gun provides a robust and already well-developed solution with proven and well documented successful operations at high repetition rate. Our reference solution is the “inverted insulator” design developed at JLAB.

The DC Gun UHV chamber is made of 316L Stainless Steel and hosts an array of six NEG pump modules. The spherical cathode holder is attached to the narrow end of a tapered conical insulator designed by INFN. The cathode electrode is made of two hydroformed hemispherical shells (316L stainless steel) welded together. The photogun is connected to a -350 kV dc Cockcroft-Walton high voltage power supply (HVPS).

In this paper we will present the rationales of the full design.

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