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The TWINEBIS test bench

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For more than a decennium REX-ISOLDE has been a key element at the ISOLDE radioactive beam facility. The post-accelerator consists of a Penning trap for bunching and cooling of the 1+ ions delivered from ISOLDE, an EBIS for charge breeding and a LINAC for the actual acceleration. It has delivered over 100 different radioactive radionuclides with an energy of a few MeV/u. While successful, the high beam demand has not allowed for intrusive machine studies to be carried out at the REX facility. In the case of the EBIS, several issues could not be investigated with the required thoroughness, for instance cathode poisoning and electron current limitations. Neither could time-modulation of the extracted ion pulse in order to match the very short injection time of the suggested TSR@ISOLDE setup, or long uniform extraction time for fixed target experiments that are presently affected by dead-time effects in detectors and/or data-acquisition systems be explored properly. Furthermore we would like to test a different type of cathode material, IrCe, which is used at other laboratories. Here the interest lies in the extractable electron current and the cathode lifetime as compared to the routinely used LaB6.

Therefore, during the last few years a dedicated offline EBIS test bench, TwinEBIS, has been setup at CERN. The EBIS is a copy of the REXEBIS, although with minor modifications in the drift-tube structure, a more versatile control system and with no injection presently available. The TWINEBIS setup has been commissioned and several investigations have begun. In this contribution an overview of the setup and the first results will be given.

By end of October we will embark on TWINEBIS - phase 2. It includes the move of the system to a more spacious laboratory area, which allows adding an injection ion-source and an analysis magnet to investigate charge breeding times for different elements as function of different settings of the EBIS, for example electron current and density, magnetic field etc. The layout of the new test facility will also be presented.

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