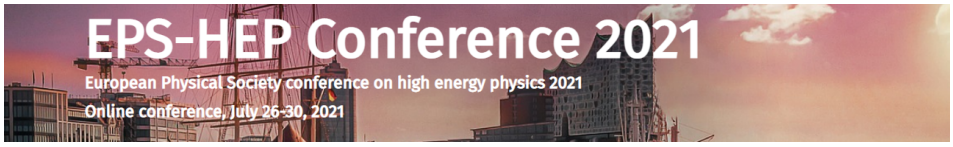

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Beam diagnostics at KAHVE Lab proton source and LEBT line

KAHVE Laboratory, a particle detector, accelerator, and instrumentation research laboratory located at Boğaziçi University Kandilli Campus area at Istanbul, is currently working on the design of a RFQ operating at 800 MHz that will accelerate proton beam up to 2 MeV. As a first part of this linear accelerator, a Microwave Discharge Ion Source operating at 2.45 GHz frequency including 20 keV electrode extraction system has been designed, produced, and tested to generate hydrogen plasma and extract proton beams from this plasma medium. To transmit beams to the RFQ cavity, Low Energy Beam Transport (LEBT) line, a beam pipe including 2 solenoid magnets, 2 steerer magnets and a beam diagnostic box between these electromagnets, has been designed and produced, tested separately for now. The beam diagnostic box, including a Faraday cup, a pepper pot plate and there will be a home-built scintillator screen, is designed to measure the current, emittance and profile of the incoming beam. Currently, there has been an upgrade on the ion source. Instead using solenoid electromagnets in order to extract ions from the thermal hydrogen plasma, a new Microwave Discharge Ion Source system has been designed and constructed with permanent magnets. After this permanent magnet configuration upgrade, since the system is operated on the high voltage platform, a higher system stability would be achieved. Permanent magnet profile tests were completed to check the simulation results, then the production of new ion source system was completed, currently it is in the test phase before integrating to the system. In the session, it will be discussed that the simulation & experimental measurement results, and any other details of the whole system, which is constructed at KAHVELab all with local resources. These projects are supported by Istanbul University Scientific Research Commission Project ID 33250 and TUBITAK Project no: 119M774

First author

Sevim Açksöz

Email

sevimaciksoz@gmail.com

Collaboration / Activity

KAHVELab

Primary authors: Ms AÇIKSÖZ, Sevim (1) Boğaziçi University Department of Physics, İstanbul, Turkey 2) Turkey R&D Intelligent Application DC Department, Huawei Technologies, İstanbul, Turkey); Dr ADIGÜZEL, Aytül (1) Istanbul University Department of Physics, Istanbul, Turkey 2) Feza Gürsey Center for Physics & Mathematics, Boğaziçi University, Üsküdar, İstanbul); Dr ÇETINKAYA, Hakan (Dumlupınar University Department of Physics, Kütahya, Turkey); Mrs ESEN, Şeyma (Istanbul University Department of Physics, Istanbul, Turkey); Ms HALIS, Duygu (Yıldız Technical University Department of Physics, Istanbul, Turkey); Ms HAMPARSUNOĞLU, Alis (Istanbul University Department of Physics, Istanbul, Turkey); Mr İLHAN, Taha Batuhan (Istanbul University-Cerrahpasa, Department of Mechanical Engineering, Avcilar, Istanbul); Mr KILIÇGEDIK, Atacan (Marmara University Department of Physics, Istanbul, Turkey); Mr KOÇER, Oğuz (Istanbul University Department of Physics, Istanbul, Turkey); Dr OĞUR, Salim (Boğaziçi University Department of Physics, İstanbul, Turkey); Mr ÖZ, Sinan

(Boğaziçi University Department of Mechanical Engineering, İstanbul, Turkey); Mr ÖZBEY, Aydın (Istanbul University-Cerrahpasa, Department of Mechanical Engineering, Avcilar, Istanbul); Prof. ÖZCAN, Veysi Erkcan (1) Boğaziçi University Department of Physics, İstanbul, Turkey 2) Feza Gürsey Center for Physics & Mathematics, Boğaziçi University, Üsküdar, İstanbul); Prof. ÜNEL, Nafiz Gökhan (1) CERN, Department of Physics, Geneva, Switzerland 2) University of California at Irvine Department of Physics, California ,USA.)

Presenter: Ms AÇIKSÖZ, Sevim (1) Boğaziçi University Department of Physics, İstanbul, Turkey 2) Turkey R&D Intelligent Application DC Department, Huawei Technologies, İstanbul, Turkey)

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