ACCELERATOR SEMINAR

Dr. Luigi Celona
(INFN-LNS)

Thursday, June 15th, 2023 at 4 pm

Online-Seminar via Zoom

Zoom: (ID: 623 4741 4161/ PW: 016934)

The upgrading of INFN-LNS facility: status and future opportunities

INFN- LNS accelerator complex of consists of a K-800 superconducting cyclotron and of a 15 MV Tandem.
The INFN-LNS Superconducting Cyclotron (SC) is a three-sector compact machine with a wide operating range, able to accelerate heavy ions with values of q/A from 0.1 to 0.5 to energy up to 80 AMeV. The SC has been in operation for 30 years circa delivering low intensity beams for different purposes but mainly for nuclear physics experiments and applications. The maximum beam power has been limited to 100 W due to the beam dissipation on the electrostatic deflectors.
To fulfill the request of users aiming to study rare processes in Nuclear Physics, a significant upgrading of the entire setup is in progress with the final aim to increase the beam power to 2-10 kW for ions with mass lower than 40 amu by means of an extraction by stripping. The feasibility of this kind of extraction through an optimized channel with an increased transverse section has been deeply studied. In the meantime, the RF system has gone through many improvements for more reliable operation of the cyclotron increasing also to 30 mm the vertical gap between the dees of the acceleration chamber by renewing the existing liners.
In order to deliver the requested beams the construction of two new ECR ion sources is required and hereinafter discussed, together with a deep review of the axial injection beam line to take into account the space charge phenomena triggered by the beam current increase.
The presentation will briefly report also about the forthcoming possibilities given by two new facilities in preparation at LNS: i-LUCE and PANDORA. I-LUCE will be the first Italian open Users facility where researchers will have the possibility to perform experiments with laser-driven radiations and activities in the Warm Dense Matter regimes while PANDORA represents a totally new and challenging approach, based on the study of decays rates in a plasma whose conditions can mimic the hot stellar environment.

GSI

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