

EPIC: Exploiting the Potential of ISOLDE at CERN

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Abstract

This paper presents the motivations to consider a significant expansion of the ISOLDE facility at CERN, as well as a description of upgrades that could be considered during the next 10-15 years. Taking advantage of the LIU (LHC Intensity Upgrades) realized during CERN's 2nd long shutdown period (2019-2021), higher intensity and higher energy proton beams will become available from 2022 onwards. If send onto an ISOLDE target, this would lead to a significant gain in intensity of the radioactive ion beams produced at ISOLDE. Additionally, the growing ISOLDE users community, which covers a wide variety of research fields (nuclear physics, nuclear astrophysics, fundamental interactions and symmetries, solid state and soft matter physics, chemistry and biochemistry) requires more space to couple their dedicated experimental equipment to new beam lines connected to the ISOLDE target stations. This calls for a new experimental hall, coupled to a new proton beam line and new modern target stations. By moving all the low-energy experiments from the current ISOLDE hall to this new facility, space becomes available in the existing building to couple a new dedicated Compact Storage Ring to the HIE-ISOLDE post-accelerator. Further upgrades of this accelerator, which reached completion in spring 2018, should guarantee the promised 10 MeV/u radioactive beam energies. These upgrades to the HIE-ISOLDE facility would also open up a lot of new research capabilities, and would profit from parallel operation to the new ISOLDE facility, thanks to the increased proton beam energy and intensity.

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