

EPIC: Exploiting the Potential of ISOLDE at CERN

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Abstract

The motivations for a significant expansion of the ISOLDE facility at CERN are presented, as well as the corresponding upgrades that should be addressed in the next 5-10 years. Taking advantage of the LIU (LHC Intensity Upgrades) realized during CERN's 2nd long shutdown period (2019-2020), the CERN Booster is now delivering a proton beam at twice higher intensity and at an increased maximum energy of 2 GeV. If such beam is sent onto an ISOLDE target, this leads to a significant gain in intensity of the radioactive ion beams produced at ISOLDE. Additionally, the growing ISOLDE user community, which addresses a wide variety of research fields, 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 (High Intensity and Energy)-ISOLDE post-accelerator. Further upgrades of this accelerator, which reached completion in spring 2018, should guarantee the promised 10 MeV/u radioactive beam energy for all isotopes produced at ISOLDE (up to Ac). These upgrades to the HIE-ISOLDE facility would also open 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.

Contents

nr. of pages

- | | |
|--|-------|
| 1. Introduction – Major components of the EPIC proposal | 2 |
| Uniqueness of ISOLDE@CERN in the world of RIB physics | |
| Take advantage of LHC Injector Upgrades (LIU) at CERN | |
| Increase of p-intensity (x2) | |
| Increase of PS-BOOSTER p-energy (1.4 to 2 GeV) | |
| A new experimental hall for new experiments | |
| Parallel beam operation by installing additional target stations | |
| Higher quality beams for improved RIB beam purification | |
| Upgrade REX-ISOLDE | |
| A new compact storage ring | |
| Impact for society | |
| 2. The Physics goals driving the EPIC proposal | 10-12 |
| a. Introduction – wide variety of research | |
| b. Nuclear Structure: key questions | |
| c. Search for New Physics beyond the Standard Model | |
| d. Nuclear Astrophysics | |

- e. Solid State Physics and (bio)chemical research
 - f. Life Science applications
3. Present and future experimental methodologies to answers the research questions 30-40
- a. Research in a new Storage Ring for short-lived isotopes at MeV/u energies.
 - b. Polarized beams for Fundamental, Nuclear and Biochemistry studies
 - c. Mass measurements
 - d. Decay spectroscopy
 - e. Experiments using 10 MeV/u beams
 - f. Precision studies to search for BSM physics with exotic radioactive decays
 - g. Radioactive molecules for nuclear structure and BSM research
 - h. Antimatter and radioactive isotopes
 - i. n-TOF and radioisotopes: a new route for nuclear astrophysics
 - j. Atomic physics techniques for nuclear and atomic physics
 - k. Techniques for materials research
- b. Benefits and challenges for ISOLDE using a higher intensity and higher energy proton beam. 12-15
- a. Impact of p-energy upgrade on production cross sections and STAGISO/NORMISO beam effect on isotope release
 - b. Beam dumps upgrade
 - c. Upgrade of transport line from Booster to ISOLDE
 - d. Beamswitching: first step to multi-user facility
 - e. New Front-Ends for high intensity
 - f. Implications for MEDICIS
5. New Ion beam production and purification systems 10-15
- a. New Target materials – nanomaterials
 - b. New laser ion source developments
 - c. Manipulation of trapped ions
 - d. Improving on the mass resolving power
6. A New Experimental hall for Low-energy experiments 15-20
- a. New low-energy experiments looking for space
 - b. New synergies between experiments and facilities
 - c. New (parasitic) irradiation stations
 - d. Concept of a new ISOLDE building
 - e. ISOLDE as a multi-user facility
7. Upgrades of the HIE-ISOLDE accelerator and experimental set-ups 20
- a. Towards higher energies from REX/HIE-ISOLDE
 - b. A superconducting ion recoil separator for HIE-ISOLDE
 - c. A new HIE-ISOLDE Compact Storage Ring (HIE-CSR)
8. Conclusions and timeline