

An Introduction to the HIE-ISOLDE Design Study

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The On-Line Isotope Mass Separator ISOLDE [1] is a facility dedicated to the production of a large variety of radioactive ion beams (RIB) for a great number of different experiments. Over 1000 radioactive nuclides from 70 elements can be produced in thick high-temperature targets via spallation, fission or fragmentation reactions with the PS-Booster pulsed proton-beam. With the arrival of CERN's new linear accelerator Linac 4 [2,3], ISOLDE will have the possibility to exploit a factor of 3 increase in proton-beam intensity and a possible proton-beam energy increase from 1.4 GeV to 2 GeV [4].

After 20 years of successful ISOLDE operation at the PS-Booster, a major upgrade of the facility, the HIE-ISOLDE (High Intensity and Energy ISOLDE) project was launched in 2010. It is divided into three parts; a staged upgrade of the REX post-accelerator to increase the beam energy from 3.3 MeV/u to 10 MeV/u using a super-conducting Linac, an evaluation of the critical issues associated with an increase in proton-beam intensity and a machine design for an improvement in RIB quality. The latter two will be addressed within the HIE-ISOLDE Design Study.

| Protons/pulse | Intensity(μ A) | Energy(GeV) | Cycle(s) | Power(kW) |
|----------------------|---------------------|-------------|----------|-----------|
| 3.3×10^{13} | 2.2 | 1.4 | 1.2 | 3.1 |
| 1×10^{14} | 6.7 | 1.4 | 1.2 | 9.3 |
| 1×10^{14} | 6.7 | 2.0 | 1.2 | 13.3 |

Table 1. Projected beam parameters considered within the HIE- ISOLDE Design study. Based on ISOLDE receiving 50% of available proton pulses from the PS-Booster.

This presentation will review the progress of the Design Study by outlining the critical issues being addressed concerning the intensity upgrade and beam quality.

REFERENCES

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- [3] M. Vretenar et.al., Progress in the Construction of Linac4 at CERN, 26th International Linear Accelerator Conference, LINAC12, Tel Aviv.
- [4] R. Garoby et al., "Plans for the Upgrade of the LHC Injectors,"IPAC2012, Conf. Proc. C1205201 (2012) TUXA02; <http://www.JACoW.org>

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