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CERN-MEDICIS: Recuperation of the dumped CERN protons for the production of medical isotopes in the ISOLDE Class A Laboratory

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The ISOLDE facility at CERN is in operation for more than forty years, and has successfully extended various technological aspects of the so-called ISOL beam production, extracting high-purity grade exotic radioisotope beam "online", while irradiating 20cm thick targets with about 50% of the available CERN 1.4 GeV protons. In its present location since 1991, the ISOLDE facility has delivered various beams to 300 different approved experiments, for fundamental research in nuclear and astro-physics, solid state physics, and biological and medical research. Our facility is also best known for its contribution to the field of medical imaging and treatment, applying radio-lanthanides such as 149Tb for PET imaging and Targeted -therapy (G.J. Beyer et al., Eur. J. Nucl. Med. Mol. Imaging (2004) 31, 547).
Here we report on the project to implement a laboratory for the production of isotopes of medical interest in the ISOLDE Class A work sector, where the target stations and related infrastructures are located. Its main characteristics will be the installation of a transport system capable of activating appropriate materials with the proton beam downstream, behind the ISOLDE production targets, before the beam is lost in the beam dumps. Indeed CERN high energy protons loose only 10% of their energy past the ISOLDE production targets, and are thus still capable of producing isotopes in an additional target irradiation stand for the present purposes. The clear advantage is that this program can be carried out without the need to fit in the streamline of the ISOLDE approved and scheduled experimental program. The infrastructure, for its optimal performance, needs in addition a radiochemical laboratory equipped with appropriate hot-cells and an isotope mass spectrometer; this type of infrastructures has shown to provide batches of carrier-free medical isotopes. The present development of the project, external collaborations and future required steps will be outlined.

Presenter: STORA, Thierry (CERN)

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