ISOLDE Timeline

For some dates of the present version on the ISOLDE timeline on iSOLDE’s home page there are a number of small misprints, here marked in red.

History

The feasibility of on-line production of short-lived radioactive isotopes was demonstrated already in 1951 by O. Kofoed Hansen and K.-O. Nielsen. They performed experiments on short-lived isotopes of noble gas elements that were produced by connecting a uranium target, irradiated with neutrons produced in an internal beryllium target in a cyclotron, directly to an isotope separator. ISOLDE, an acronym for Isotope Separator On Line (**DEvice: leave out!)** , was originally proposed at the 600 MeV Proton Synchrocyclotron in 1964. The first experiments started there in 1967. ISOLDE underwent several upgrades until it was finally moved to the PSB in 1992. Amongst the existing facilities, ISOLDE presently offers worldwide a wide diversity of radioactive isotopes, and the installation of a post-accelerator at ISOLDE (REXISOLDE) has opened new fields of research with radioactive ion beams of higher energies. In this respect the facility is complementary to other European radioactive ion beam accelerators such as SPIRAL (GANIL, France) and GSI (Darmstadt, Germany), and provides a wider range of intense accelerated ions compared to

HRIBF (Oak Ridge, USA) and ISAC (Vancouver, Canada ).

*Comment: DEvice has never been used. It is only the four first letters that refer to the technique. DE was added to give the Facility a more fancy name. As an interesting detail there were also a similar on-line project that was named TRISTAN.*

01/04/51

Kofoed-Hansen and Nielsen produce short-lived radioactive isotopes

Danish physicists Otto Kofoed-Hansen and Karl-Ove Nielsen, working at the Institute for Theoretical Physics at the University of Copenhagen, are first to demonstrate how to produce radioisotopes with an on-line technique. In a paper entitled Short-lived Krypton isotopes and their daughter substances Kofoed-Hansen and Nielsen demonstrate the feasibility of on-line production of shortlived radioactive isotopes.

They used fast neutrons, produced in the Copenhagen cyclotron in an internal Be target, to bombard a uranium oxide target. The produced fission products are swept directly into the ion source of an isotope separator. This direct coupling of the accelerator, target and separator

gave access to isotopes with shorter ha half-lives than any earlier indirect production method.

17/12/64

On 10 April 1963, a number of European nuclear physicists meet at CERN to discuss the isotope separator project. A first outline is presented in an internal nuclear physics division report. A Working Party is set up and a series of meetings are held from May to September. In a memorandum dated 26 October 1964 the chairman of the Nuclear Structure Committee Torleif Ericson recommends the on-line isotope separator project to CERN and on 9 November the Working Party submit a formal proposal. On 17 December 1964 the Director-General gives formal permission to the groups behind the proposal to carry out the experiment.

8/5/66

On 8 May 1966, the CERN Synchrocyclotron begins a long shutdown until mid-July. During this time major modifications are carried out as part of a programme to improve the capacity of the machine and its associated facilities. One of the main items of work during the shutdown is the construction of a new(delete) tunnel for an external proton beam line to the new underground hall for the ISOLDE experiments. This tunnel is constructed underground to keep external radiation levels down and the existing proton room is kept for experiments that use beams of lower intensity.

11/3/74

First beams for ISOLDE target

In March 1974, the SC improvement programme is completed and the first beams are directed towards the ISOLDE targets.

The intensity increase of the external beam up to 1 μA together with new target designs hold their promises and give a considerable increase in the number of isotopes available for experiments. A new target design and a new layout of the isotope separator is implemented. The target-ion-source unit is placed in the proton beam and the magnet of the isotope separator is placed close to the target. The separated isotopes are then directed towards the experimental setups via a switchyard, which allows researchers to do experiments with isotopes of different mass numbers simultaneously.

The first experiment at the reconstructed ISOLDE Facility was performed on March 11, where a target-ion-source system for production of neutron deficient Cs isotopes was used to detect combined beta-delayed proton and alpha emission for the Cs isotopes with mass numbers 118 and 120.

06/04/76

New experiments are installed at ISOLDE II and placed at the three main beam-lines. The photo shows the underground hall UR8 on April 6 1976 which only housed experimental installations. The control desk could be found one floor above.

26/6/92

First experiment at the ISOLDE Proton-Synchrotron Booster

The first experiment was carried out on June 26, where the beta-proton decay of the neon isotope with mass number 17 was studied. This experiment was relevant for the understanding of nuclear halo structure, first proposed at ISOLDE.