

The ISOLDE facility at CERN: production, study and application of exotic isotopes.

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The ISOLDE facility is the longest running experiment at CERN. It is also the last fully dedicated to nuclear physics and its applications. In the 45 years since it first produced radioactive beams, it has pioneered the production of radioisotopes using the ISOL technique producing ever-more exotic beams. Now, in 2013, more than 1000 radioisotopes from 70 elements can be produced and this has inspired a rich and extremely varied experimental programme. Although 50% of the experimental programme is still dedicated to pure nuclear physics, applications constitute an important and growing aspect of the activity at ISOLDE.

The applied programme at ISOLDE is in itself extremely varied spanning materials physics, biophysics and medicine. These latter two have been the subject of considerable growth in the past few years. In particular the development of an innovative beta-NMR system, which will allow the study of spectroscopically “blind” but vitally important elements such as Cu and Zn in biological systems, has been tested and is being prepared for full operation in 2014. Research in medical physics has been bolstered by the announcement that from 2016, ISOLDE will produce exotic isotopes to investigate novel aspects of imaging and therapy. This new facility – MEDICIS (Medical Isotopes collected at Isolde) – has recently commenced construction and is a collaboration between ISOLDE/CERN and numerous hospitals around Switzerland.

This talk will give an overview of the ISOLDE facility, in particular with reference to the production and purification of radioactive beams. Then, a detailed overview of some of the recent highlights from the nuclear physics programme, with particular attention to the applications mentioned above will be presented.

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