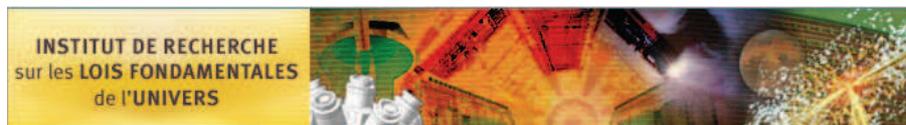


## Service de Physique Nucléaire



### Séminaire

le vendredi 27 juin 2014 à 11h

CEA Saclay, Orme des Merisiers, Bât. 703, Salle 135

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**Atomic physics techniques to investigate radio-nuclei at the ISOLDE facility :  
from Parkinson disease to rarest isotope on Earth**

Magdalena Kowalska

ISOLDE, CERN

This talk is devoted to the recent physics results obtained with atomic-physics techniques – lasers and ion traps – at the ISOLDE facility ([www.cern.ch/isolde](http://www.cern.ch/isolde)), which is the CERN laboratory for research with radioactive nuclei and that celebrates its 50th anniversary this year.

From the known 3000 atomic nuclei, more than 1000 isotopes of over 70 chemical elements have been produced at ISOLDE in reactions induced by 1-GeV protons in thick targets made of materials such as uranium or tantalum. Some of the nuclei have been even discovered here.

The ISOLDE experiments are as versatile as the available beams. Many of them make use of atomic-physics methods, especially lasers and ion traps, to address questions ranging from nuclear and atomic physics, passing via and astrophysics and fundamental studies, up to applications in material science, biology and medicine. Recent results in nuclear physics include the precise determination of masses of calcium-53 and 54, with the ISOLTRAP Penning trap setup, which served as a testing ground for ab-initio nuclear models and which revealed a new neutron shell closure at  $N=32$  (F. Wienholtz et al, *Nature* 498 (2013), 346). In atomic physics, astatine – the rarest element on earth – has seen its ionization potential determined, providing the last missing value for naturally-occurring elements (S. Rothe et al., *Nature Communications* 4, 1835 (2013)). In biology, a new ultra-sensitive NMR technique has been employed for the first time to liquid samples, at the COLLAPS setup for laser spectroscopy, opening the way for new studies of metal-ion interaction with proteins and nucleic acids (<http://cds.cern.ch/journal/CERNBulletin/2012/37/News%20Articles/1475670>). Several other results obtained with the above setups will be also presented.

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*Le café sera servi 10 minutes avant*

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