THE PHYSICS COLLOQUIUM

Thursday 30 March 2023, 4:00 p.m.
Nijenborgh 4, Lecture Hall 5115.0317 (Schröderzaal)

Precision measurements of atomic nuclei for nuclear astrophysics

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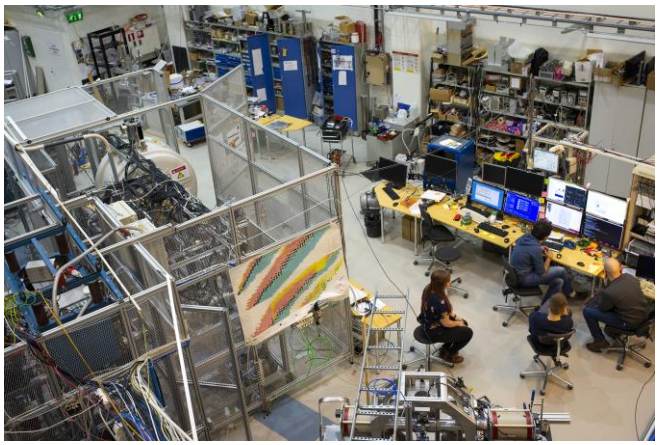
Almost all chemical elements found in nature have been formed in stars and stellar events. Elements up to around iron can be created via fusion reactions inside stars whereas heavier elements than iron are mainly formed via neutron capture processes. The rapid neutron capture process, the r process, is responsible for around half of the heavy-element abundances above iron.



To better understand the r process and the creation of heaviest elements in nature, properties of neutron-rich nuclei, such as their masses, have to be known precisely as they are essential inputs for the r-process calculations. Nuclear masses also play an important role in explosive hydrogen burning taking place in binary-star systems, such as novae or type I x-ray bursts.

Penning-trap mass spectrometry is currently the most precise method to perform high-precision atomic mass measurements. It can be applied to short-lived nuclides as well and provides a way to precisely determine nuclear masses (binding energies) that are used as inputs for nuclear astrophysics calculations. We have measured around 440 atomic masses with the JYFLTRAP double Penning trap mass spectrometer at the IGISOL facility, located in the Accelerator Laboratory of the University of Jyväskylä.

In addition to mass measurements, IGISOL offers versatile opportunities for other studies. In my presentation, I will give an overview with selected highlights on precision measurements for nuclear astrophysics at the IGISOL facility.

Join us for coffee starting 3:30 p.m. Refreshments will be served after the lecture.
For more information contact the host: Julia Even (j.even@rug.nl)
Website: http://www.rug.nl/research/vsi/colloquia/