

Recent mass measurements for nuclear structure and astrophysics at JYFLTRAP

Wednesday, 23 May 2018 09:00 (20 minutes)

JYFLTRAP is a cylindrical double Penning trap mass spectrometer [1] located at the Ion Guide Isotope Separator On-Line (IGISOL) [2] facility in Jyväskylä. In total, over 330 atomic masses for nuclear structure, fundamental physics and nuclear astrophysics have been measured with JYFLTRAP. In this contribution, I will discuss our recent results for nuclear structure and astrophysics.

On the neutron-deficient side, the measurements of ^{31}Cl ($T_{1/2}=190$ ms) [3] and ^{52}Co ($T_{1/2}=104$ ms) [4] are among the most exotic nuclei ever studied at JYFLTRAP. Their masses are important for testing the isobaric multiplet mass equation as well as for the rapid proton capture (rp) process occurring e.g. in type I X-ray bursts. The new, more precise proton separation energy for ^{31}Cl helps to constrain astrophysical conditions where ^{30}S can act as a waiting point in the rp process. Also new heavier isotopes in the $A=80$ region have recently been measured using $^{36}\text{Ar}+^{nat}\text{Ni}$ fusion-evaporation reactions at the HIGISOL heavy ion guide. On the neutron-rich side, we have extended our studies to heavier fission-fragment region relevant for understanding the formation of the rare-earth peak in the astrophysical r process [5].

References

1. T. Eronen *et al.*, Eur. Phys. J. A **48** (2012) 46.
2. I.D. Moore *et al.*, Nucl. Instrum. Meth. Phys. Res. B **317** (2013) 208.
3. A. Kankainen *et al.*, Phys. Rev. C **93** (2016) 041304(R).
4. D.A. Nesterenko *et al.*, J. Phys. G: Nucl. Part. Phys. **44** (2017) 065103.
5. M. Vilén *et al.*, *submitted*.

Primary authors: Dr KANKAINEN, Anu (University of Jyväskylä); Ms CANETE, Laetitia (University of Jyväskylä); Dr ERONEN, Tommi (University of Jyväskylä); Prof. JOKINEN, Ari (University of Jyväskylä); Prof. MOORE, Iain D. (University of Jyväskylä); Dr NESTERENKO, Dimitrii (University of Jyväskylä); Dr PENTTILÄ, Heikki (University of Jyväskylä); Dr RINTA-ANTILA, Sami (University of Jyväskylä); Dr DE ROUBIN, Antoine (University of Jyväskylä); Mr VILÉN, Markus (University of Jyväskylä)

Presenter: Dr KANKAINEN, Anu (University of Jyväskylä)

Session Classification: Session 5