Contribution ID: **305**   Type: **Invited Presentation**

Recent Mass Measurements for Nuclear Astrophysics at JYFLTRAP

Friday, 2 June 2017 11:55 (25 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 focus on recent mass measurements for nuclear astrophysics obtained after the recommissioning of JYFLTRAP at the IGISOL-4 facility in 2014.

In the neutron-deficient side, ^{31}Cl [3] and ^{52}Co [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. We have also improved the precisions of proton-capture Q-values relevant for calculating the proton-capture rates for two key reactions, $^{25}Al(p,g)^{26}Si$ and $^{30}P(p,g)^{31}S$ [5]. Accurate knowledge of the reaction rates is needed for more reliable calculations of the amount of cosmic 1809-keV gamma rays and abundances of intermediate-mass elements in novae, respectively. In the neutron-rich side, we have recently extended our studies to the heavier fission-fragment region relevant for understanding the formation of the rare-earth peak in the astrophysical r-process.

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., arXiv:1701.04069 [nucl-ex]
[5] L. Canete et al., Eur. Phys. J. A 52 (2016) 124

Primary author: Dr KANKAINEN, Anu (University of Jyvaskyla)

Presenter: Dr KANKAINEN, Anu (University of Jyvaskyla)