Contribution ID: **7** Type: **not specified**

In-beam gamma-ray spectroscopy next to 78Ni: the nuclei 77,79Cu (Status report for data analysis of RIBF30 experiment)

Monday, 15 September 2014 11:35 (20 minutes)

The question of the shell closure stability near the neutron drip-line has been in the forefront of the nuclear structure research for a long time. The next major neutron shell closure occurs at N=50, which is investigated in the vicinity of the possible doubly magic 78Ni. The doubly magic nature of 78Ni depends on the strength of the N=50 and Z=28 shell closures. The shell closures can be described by the shell gaps, determined by the energy differences between proton and neutron single particle states. The Z=28 shell gap can be deduced from single particle energies of heavy Cu isotopes.

Copper isotopes next to 78Ni have been studied by use of in-beam γ-ray spectroscopy. The experiment was performed at RIKEN RI Beam Factory where a high-intensity 238U primary beam with energy of 345 MeV/u impinged on a 925 mg/cm 2 primary beryllium target. The produced RI beams were separated and identified using the BigRIPS spectrometer by the ΔE−ToF−Bρ method. As a next step the tagged fragments were collided with a 1900 mg/cm 2 secondary beryllium target for the nucleon-removal reactions. The reaction channel selection after the secondary reaction was carried out by the ZeroDegree spectrometer. The NaI(Tl)-array called DALI2 surrounding the secondary target detected the γ-rays emitted by the secondary fragments.

During the data analysis a strict time gated procedure has been applied on the DALI2 part of the events. Using this method several gamma-ray transitions could be assigned to 77,79Cu from single proton removal reaction channels. Level schemes have been built and compared with the shell model calculations. Stability of the Z=28 shell gap and decrease of the f5/2-f7/2 spin orbit splitting with increasing mass number has been observed. In the presentation the details of analysis will be discussed.

Primary author: VAJTA, Zsolt (Atomki)

Presenter: VAJTA, Zsolt (Atomki)

Session Classification: Session 2