



Contribution ID: 220

Type: Poster

## Single-particle states in neutron-rich copper isotopes

Thursday, 3 September 2015 16:30 (1h 30m)

The behaviour of the shell structure for exotic nuclei is far from being well known. When going far from stability, some old magic numbers can disappear and new ones can appear. We here discuss about neutron-rich copper isotopes towards the  ${}^{78}\text{Ni}$  doubly-magic nucleus, with the strength functions of the shell-model orbitals measured in the  ${}^{72}\text{Zn}(d,{}^3\text{He}){}^{71}\text{Cu}$  proton pick-up reaction in inverse kinematics with a radioactive beam at GANIL in France. It shows that the  $Z=28$  shell gap in the neutron-rich copper isotopes is not appreciably affected by the addition of neutrons beyond  $N=40$ . We also present the latest results from an experiment leading to selective population of hole states in  ${}^{79}\text{Cu}$ , through the  ${}^{80}\text{Zn}(p,2p){}^{79}\text{Cu}$  knock-out reaction with the liquid-hydrogen target MINOS, performed at RIKEN in Japan and being currently analysed.

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**Session Classification:** Poster