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Shell Evolution Towards 78Ni: Spectroscopy of 76Cu

How well the nuclear shell model fits for very unstable neutron rich nuclei, is an important question which will help us see whether we have fully understood the neutron-proton interactions that happen within the nucleus. One way to investigate this is to carefully study the energy levels and shell gaps in nuclei close to doubly magic 78Ni. The aim of the present work is to contribute to the understanding of the shell structure and thus effects of the nuclear forces through the 76Cu nucleus.

The excited states of 76Cu were accessed via the beta decay of 76Ni for the first time. The experimental study has been performed at RIKEN Nishina Center, Japan. Radioactive isotopes in the 78Ni region were produced via in-flight fission of 238U primary beam with an energy of 345 MeV/nucleon on a thick 9Be target. After being selected and identified in the BigRIPS fragment separator, the 76Ni nuclei were implanted in the WAS3ABi active stopper. The EURICA array with 12 Ge cluster detectors was surrounding the active stopper for the detection of gamma rays emitted from 76Cu nuclei after the β decay of the 76Ni ions. Data from RIKEN has been analyzed to find the gamma energies emitted from 76Cu and with this the energy levels have been found through the gamma coincidence analysis. In this poster, the work done so far on 76Cu will be presented.

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