Comenius University Bratislava
Faculty of Mathematics, Physics and Informatics

Meno a priezvisko študenta:	Gulnur Kantay
Študijný program:	Nuclear and Subnuclear Physics (Single degree study, Ph.D. III. deg., full time form)
Študijný odbor:	13. Physics
Typ záverečnej práce:	Dissertation thesis
Jazyk záverečnej práce:	English
Sekundárny jazyk:	Slovak

Title: Shape coexistence in the vicinity of Z = 28 closed shell: structure of the 58Ni and 61Cu isotopes

Abstrakt: The dissertation thesis presents the results of the in-beam spectroscopic study of the 58Ni and 61Cu isotopes. The experiment was performed at the 6 MV Tandem accelerator in Trnava carried out by the Department of Nuclear Physics, The Slovak Academy of Science in collaboration with the Faculty of Materials Science and the Technology in Trnava, The Slovak University of Technology in Bratislava. The excited states of the 58Ni isotope were observed via (α, α′) reaction. The new γ-decay is reported as a good candidate for the observation of the new excited 0+ state in the 58Ni isotope. The excited states of the 61Cu isotope were observed by the (α, p) reaction. A total of 12 γ-rays, marked as uncertain in the Nuclear Data Sheets, were identified in the Trnava experiment. Five new γ-transitions are reported for the first time. The γ-transition, marked as uncertain in the Nuclear Data Sheets, was observed in 61Ni. The analysis of other channels of the 58Ni+ α reaction from the Trnava experiment was conducted, and the results are presented.

Dizertacná práca prezentuje výsledky in-beam spektroskopickej štúdie izotopov 58Ni a 61Cu. Experiment sa uskutocnil na 6 MV Tandemovom urýchlovaci v Trnave, ktorý realizovalo Oddelenie jadrovej fyziky SAV v spolupráci s Materiálovotechnologickou fakultou STU so sídlom v Trnave. Excitované stavy izotopu 58Ni boli pozorované prostredníctvom reakcie (α, α′). Nový γ-prechod predstavuje vhodného kandidáta na pozorovanie novonavrhnutého excitovaného stavu 0+ v izotope 58Ni. Excitované stavy izotopu 61Cu boli populované reakciou (α, p). V experimente z Trnavy bolo identifikovaných celkovo 12 γ-prechodov pre izotop 61Cu, pôvodne oznacených v literatúre ako neurcité. Navyše, pozorovali sme pät nových γ-prechodov pre izotop 61Cu. Jeden γ-prechod, oznacený ako neurcitý v literatúre, bol pozorovaný v 61Ni. Bola vykonaná analýza dalších reakcných kanálov 58Ni + α experimentu v Trnave a tieto výsledky sú tiež uvedené v práci.

The dissertation thesis presents the results of the in-beam spectroscopic study of the 58Ni and 61Cu isotopes. The experiment was performed at the 6 MV Tandem accelerator in Trnava carried out by the Department of Nuclear Physics, The Slovak Academy of Science in collaboration with the Faculty of Materials Science and the Technology in Trnava, The Slovak University of Technology in Bratislava. The excited states of the 58Ni isotope were observed via (α, α′) reaction. The new γ-decay is reported as a good candidate for the observation of the new excited 0+ state in the 58Ni isotope. The excited states of the 61Cu isotope were observed by the (α, p) reaction. A total of 12 γ-rays, marked as uncertain in the Nuclear Data Sheets, were identified in the Trnava experiment.

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