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In-beam γ-ray spectroscopy of ^{94}Ag

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The concept of isospin has been introduced to explain the apparent exchange symmetry between protons and neutrons. However, if the nuclear force were the same for neutrons and protons properties such as excitation energies and masses would depend only on the mass number A. Recent studies have shown that the Coulomb force cannot account for all deviations, suggesting that other isospin-symmetry-breaking components must be present. N~Z systems present the perfect testing ground to probe isospin symmetry phenomena [1-3]. In particular, pairing correlations have a significant importance in the description of the nuclear structure of N=Z nuclei, where neutrons and protons are arranged occupying the same orbits, allowing T=0 np pairing in addition to the normal T=1. It was recently suggested that spin-aligned T=0 np pairs dominate the wavefunction of the y-rast sequence in ^{92}Pd [4]. Subsequent theoretical studies were devoted to probe the contribution of np pairs in other N=Z A>90 nuclei [5-6], suggesting that a similar pairing scheme strongly influences the structure of these nuclei. In an effort to answer this question further, a recoil beta tagging experiment has been performed to try and identify the excited T=0 and T=1 states in odd-odd N=Z ^{94}Ag via the ^{40}Ca(^{58}Ni,p3n)^{94}Ag reaction using MARA recoil separator and JUROGAM3 array at the Accelerator Laboratory of the University of Jyväskylä.
The detailed goals of the experiment, the setup, tentatively identified transitions, experimental CED and nuclear shell model predictions will be shown in this presentation. A preliminary interpretation of the experimental results will also be discussed.

References

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