TITLE:
Search for the deep hole 1s state in medium weight nuclei by (p,2p) reactions

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RUNNING TIME : 11 days
BEAM LINE : WS-course
BEAM REQUIREMENTS : 400nA 392 MeV polarized protons
BUDGET : 5.1 M Yen

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SUMMARY OF THE PROPOSAL :

We are going to knock-out the deep hole 1s state in ^{40}Ca and ^{90}Zr by the (p,2p) reaction at E_p = 392 MeV with a new measurement method limiting the recoil momentum. The cross section of the knock-out reaction from s-states has a maximum at zero recoil momenta, while the cross section of p- or d-states have a minimum at recoil momentum =0. Thus, by inserting wire chambers in front of the Grand Raiden and the LAS spectrometers and by tagging the vertical and horizontal scattering angles, we can measure the energy spectra keeping the recoil momentum nearly zero. We have already succeeded to measure the energy spectrum of $1s_{1/2}$ state in ^{40}Ca in (p,2p) reaction of 1 GeV proton incident energy at Gatchina, by limiting the recoil angles with the vertical slits. The aims of this proposal are to identify the 1s1/2 states for ^{40}Ca and ^{90}Zr, and to measure cross sections , widths ,and analyzing powers exciting the deep hole states for the first time. These observables are fundamentals in Nuclear Physics related to correlations of nucleons deep inside the nucleus, life times of the single particle orbit, and medium effects of N-N interaction inside the nucleus.