RCNP EXPERIMENT E156

PROPOSAL FOR EXPERIMENT AT RCNP

29/09/2000

TITLE:

Test experiment to observe nuclear medium effects on ρ-mesons via ^{40} Ca $(\vec{p}, \vec{p'})$ reaction at $E_p = 300\,\mathrm{MeV}$

SPOKESPERSON:

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EXPERIMENTAL GROUP:

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RUNNING TIME:

Test running time for experiment 4 days

BEAM LINE: WS (WS beam line + Grand Raiden)

BEAM REQUIREMENTS:

Type of particle: Polarized Protons
Beam energy: 295MeV
Beam intensity: 2-500nA on target
Energy resolution: 13keV(FWHM)
Injection mode: High Resolution Mode
WS transport mode: Dispersive/Achromatic Modes

BUDGET:

Summary of budget request 2,000,000

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SUMMARY OF THE PROPOSAL

The study about medium effects of the N-N interaction is one of the interesting subjects in nuclear physics and their effects have been investigated so far via measurements of elastic scattering, inelastic scattering and (p,2p) reactions on some targets. Although contributions from σ- and ω- meson have been reported in the measurements of proton elastic scattering at intermediate energies, the effects and phenomena by π- and ρ- meson are not observed because of the experimental difficulties. In order to identify the contribution by $T = 1$ mesons, measurements for isovector transitions in medium and heavy nuclei are necessary. Due to the higher excitation energy for isovector states high resolution measurements are inevitable to separate them clearly among the closely spaced isoscalar states. This proposal aims at testing and developing the necessary experimental techniques to measure cross sections and the polarization observables at backward angles to determine medium effects on π- and ρ- mesons via a high resolution measurement of ^{40} Ca $(\vec{p}, \vec{p'})$.