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Measurement of the polarization of the deuteron beam at RIKEN RIBF

To pin down the properties of the three-nucleon forces, we are planning to measure the spin correlation coefficients for deuteron-proton scattering around 100 MeV/u at RIKEN RIBF. For the measurement of the spin correlation coefficients, the polarized deuteron beam and the polarized proton target are required.

The polarized ion source (PIS) was renewed after a long break of the polarized deuteron beam experiment in 2015. In this study, we conducted the performance test of the polarized deuteron beam. The polarized deuteron beam was provided by the PIS and then was accelerated up to 7 MeV/nucleon by the AVF cyclotron. The beam polarization measurement was performed by using the beamline polarimeter which was newly installed just downstream of the AVF cyclotron. The beam bombarded the graphite target and was stopped in a Faraday cup. The typical beam intensity was 10 nA. The polarimetry was made by using the $^{12}\text{C}(\vec{d}, p)^{13}\text{C}_{\text{gnd.}}$ reaction. The obtained deuteron beam polarization was $p_y = -0.556 \pm 0.013$ and $p_{yy} = -0.741 \pm 0.039$.

In this contribution, I will present the preparation of the polarized ion source and the measurement of the deuteron beam polarization.

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