Commissioning of proton-carbon CNI polarimeter for RHIC

Kazuyoshi Kurita[a,b]

[a] *Rikkyo University*
[b] *RIKEN BNL Research Center*

Recently 100GeV/c polarized proton beams became available for collider experiments at RHIC in Brookhaven National Laboratory. This RHIC spin program is expected to shed light on the spin dependence of high energy QCD processes. One of the most exciting processes is direct photon production to study the gluon contribution to the proton spin. It is the area where previous polarized DIS experiments could not reach[1] due to the fact that charged currents do not couple with gluons directly.

During the preparation of the polarized proton acceleration, we have been developing a RHIC polarimeter. Finally we experimentally found that proton-carbon elastic scattering in Coulomb-Nuclear-Interference (CNI) region can be used for the RHIC polarimeter[2]. The analyzing power of the process was measured by AGS-E950 at the RHIC injection energy. We plan to calibrate it at RHIC energies, namely 100GeV/c and 250GeV/c, with a polarized hydrogen gas jet target which we are going to build and start to operate by 2004.

We will discuss the performance of the RHIC CNI polarimeter during the polarized proton acceleration commissioning period and our plan to calibrate it at the RHIC energies. It should be pointed out that the beam energy dependence of the CNI analyzing power has its own physics interest. It is because the E950 result indicates the analyzing power may include hadronic spin flip amplitude and its energy dependence will lead to better understanding of it.

References

[1]B. Adeva et al., PRD **58** (1998) 112002.
[2]K. Kurita, Nucl. Phys. B (proc. suppl.)**105** (2002)164.