

Report on E452

The hyperon-nucleon scattering experiment E452 has been started at the K2 beam line.

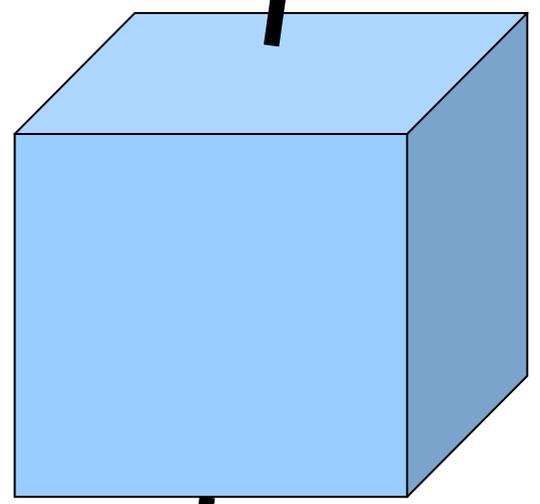
The E452 is one among a series of hyperon scattering experiments which have been carried on at the K2 beam line. The present experiment aims at studies of spin dependent hyperon-nucleon interactions with use of the polarized hyperons produced through the (π , K) reactions in an active target of scintillating track detector. Particular interest is to determine the spin-orbit strength of the Σ^+p interaction from measurements of right-left asymmetries of the polarized- Σ^+ scattering.

For this experiment a new-type track detector named SCITIC (SCIntillating Track Image Camera : Fig.1) was developed so as to take pictorial data of hyperon scattering with a fast trigger signal from the beam- and kaon-spectrometers. Typical examples of the pictures are shown in Fig. 2 which were selected by trigger signals indicating (π , K) reactions. Those are pictures of (a) Λ^0 production, (b) Σ^+ production and (c) Σ^+ scattering.

A preliminary run has been carried out to test the performance of the new detector and a fast pictorial-data acquisition system, in combination with the existing spectrometers. Pion beams of 1.6GeV/c were used on a liquid-scintillator active target. The kaon spectrometer was set to cover kaon angles from 20 to 40° to select Σ^+ with large polarization. Pictures of up to 60,000 events were accumulated, out of which about 500 events are expected to be the Σ^+ hyperon scattering events. Analyses of the data are going on to test new algorithm such as a computer-assisted picture scanning.

Having been convinced with the SCITIC application for the hyperon-scattering experiments a new lens system with a larger scale was designed and being constructed for the next run in the fall of 2001.

Charged Particle



Scintillator



Lens

IIT

CCD

