STUDIES OF NEUTRAL VEE PRODUCTION BY Si IONS AT
14.5 x A GeV/c IN Au AND Cu*

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We have measured central interactions of Si ions at 14.5 $\times A$ GeV/c in Cu and Au targets. Charged particles produced in the forward hemisphere in the nucleon-nucleon center-of-mass (20 deg. in the lab) were measured with a set of time projection chamber modules (TPC's). Charged particle multiplicities of up to 90 were reconstructed in a single event. The 3 TPC modules were placed in thhe center of the MPS magnet which was run at 5 Kg. No dE/dx information was recorded from the TPC. The trigger was based on a scintillation counter 8 meters downstream of the target to veto on high Z fragments in the beam region, and a pair of counters just upstream of the TPC to select interactions from the target. A typical Si Au event is shown in Fig. 1.

We have reconstructed neutral vees, using cuts on the tracks to reduce the background from uncorrelated tracks from the production vertex. For pairs of positive and negative particles forming a decay vertex 10 cm or more downstream of the target we obtain the effective mass distributions shown in Fig. 2 for the hypothesis proton and π^-. A clear Λ signal is apparent. The mass spectrum for the hypotheses π^+ and π^- also shows a clear K_s^0 signal. As a measure of the effective number of collisions we have chosen the negative particle multiplicity, cutting the date to accept only those tracks which have good acceptance; the particles had to remain in the active area throughout the first module and have rapidity > 1.7. The Λ and K_s^0 data were limited to the region of good acceptance; 1.2 < y < 3 for Λ, and 2.2 < y <3 for K_s^0. The Λ yield is shown in Fig. 3 as a function of negative multiplicity. The data are consistent with a linear increase. Also shown are the results of a simulation based on HIJET, including secondary scattering at the maximal level. Reasonable agreement is obtained. A similar plot for K_s^0 production is shown in Fig. 4. Once again a linear dependence is seen in the data, but the simulation gives too little K_s^0 production. It is expected that the inclusion of secondary meson scattering will increase the predicted production of K_s^0.

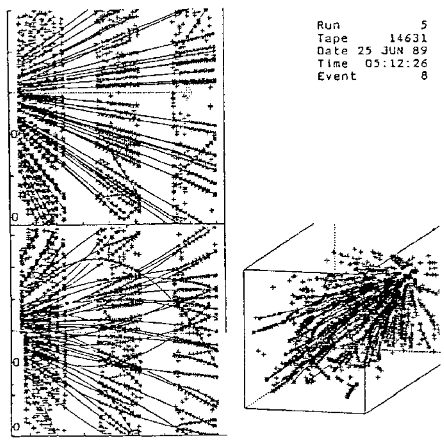

Fig. 1 A typical Si Au event.

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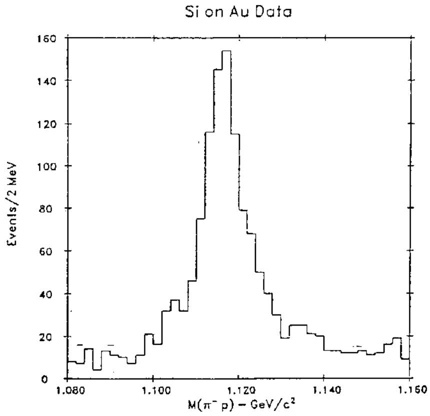

Fig. 2 Effective mass spectrum for $\pi^- p$ hypothesis for the Au target data. The solid lines are the known lifetimes.

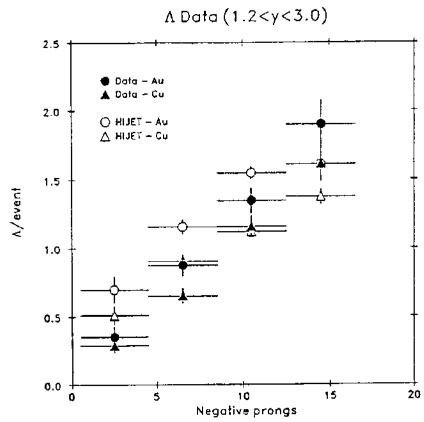

Fig. 3 Λ yield in the rapidity region $1.2 < y < 3.0$ as a function of negative track multiplicity as described in text. The errors shown are statistical only.

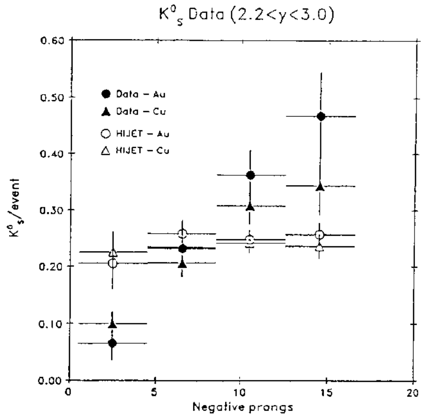

Fig. 4 K_s^0 yield in the rapidity region $2.2 < y < 3.0$ as a function of negative track multiplicity as described in text. The errors shown are statistical only.

DISCUSSION

Q. M. **Jacob** *(CERN)*: (i) You said that your observed Λ yield implies an important rescattering effect. What is the value of the mean free path which you use? (ii) Is there a possibility of measuring the effective Λ lifetime to look for a possible ΞΛ filiation?

A. **K. Foley**: (i) ~ zero.
(ii) Not yet. This requires simulation studies which have not been done yet.