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PROPOSAL TO STUDY 400 GeV PROTON INTERACTIONS IN NUCLEAR EMULSION

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4 pgs.

SUMMARY

Emulsion plates of novel design will be prepared in order to selectively scan for inelastic interactions producing energetic tracks at large (greater than 30°) angles.

GENERAL DESCRIPTION

We will prepare nuclear emulsion plates (600 microns thick Ilford K5, glass-backed) of novel shape, as shown in fig. 1. Two stacks, each containing 6 plates, will be exposed to a 400 GeV proton beam which has been focussed to the narrowest possible diameter (less than 5-10 mm). One stack will receive a total dose of 1×10^5 protons/cm^2, and the other 2×10^5 p/cm^2. Following development, the "wings"of the plates will be scanned for energetic tracks produced at large (greater than 30°) angles. The large-angle tracks will be followed back to their interaction vertex. This scanning procedure should yield a sample of events enriched in high p_t events. The usual emulsion analysis methods (counting of tracks, angular measurements, search for short-range decays) will be applied.

BEAM REQUIREMENTS AND NAL FACILITIES NEEDED

Our needs are the typical ones for emulsion exposures:

a) an exposure table with surface parallel to beam direction;
b) a beam monitor measuring the integrated flux delivered;
c) use of a darkroom for test plate development (e.g., the 30' B.C. darkroom).

As indicated above, we will prepare two stacks, requiring a total exposure of about 3×10^5 protons into an area of less than one cm^2. The minimum practical beam diameter is requested.

PERSONNEL COMMITMENT AND ANALYSIS TIME

One scanner and one physicist will work on this project. From past experience, one to two years will be required to complete the data analysis.

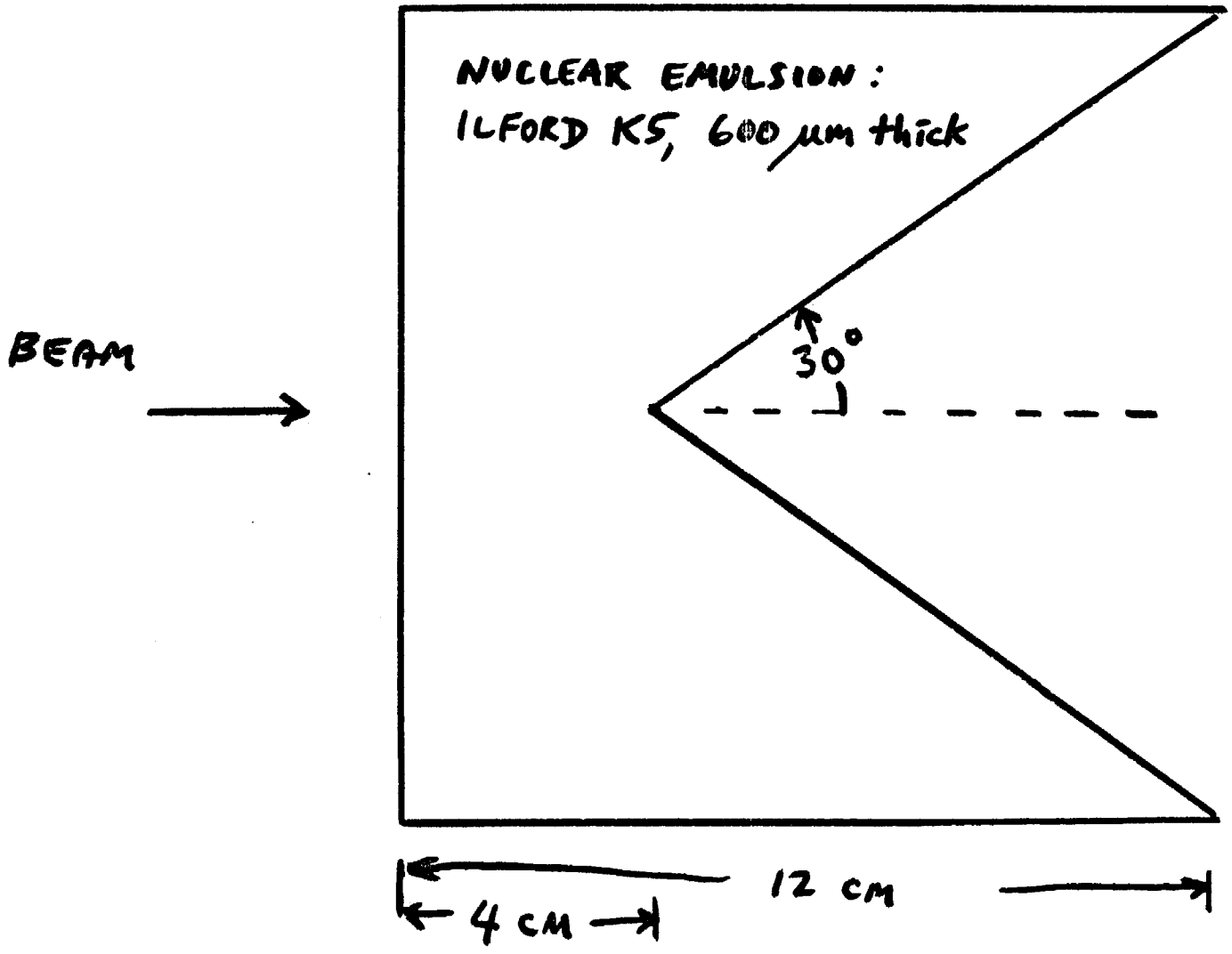

FIG. 1