

FERMILAB-Proposal-0510

FNAL Proposal

Study of cascade showers initiated by electrons.

H.Fuchi, K.Hoshino, S.Kuramata, K.Niu*, K.Niwa
S.Tasaka, Y.Yanagisawa

Department of Physics, Nagoya University
Chikusa-ku, Nagoya, Japan

N.Ushida

Faculty of Education, Aichi University of Education
Kariya, Aichi, Japan

Y.Maeda

Faculty of Education, Yokohama National University
Hodogaya-ku, Yokohama, Japan

6, September 1976

* ; Spokesperson K.Niu, Nagoya University

Telephon 052 (781) 5111 ext. 2444

Telex 04477323 SCUNAG J

5 Pgs

The Purpose of the Experiment.

In the course of studying 303 and 400 GeV/c proton interactions (FNAL Proposal No.242 and No.243), we observed 3 direct electron events (Table 1). The energy of each electron was estimated by the usual cascade method applied to γ rays. The method was calibrated by making invariant mass distributions of two γ rays and finding π^0 peak (Fig. 1). We feel, however, this is not sufficient to make accurate estimation of the electron energy.

Therefore, we wish to make calibration of the method for energy determination on electrons, irradiating electrons with definite energy on the emulsion chambers of the same design as those of proposals No.156, No.242 and No.243 (Fig. 2).

Detectors.

The detectors are emulsion chambers consisting of nuclear emulsions and thin lead or tungsten absorbers. Each chamber has a size of 12cm \times 9cm \times 5 \sim 14cm. Number of chambers will be 6.

Conditions required.

Conditions required in this experiment are quite parallel to the proposal No.340 by Dr.Dake.

- (1) Beam; parallel and mono-energetic electron beam.
- (2) Energy of the irradiated electron; several points between 50 GeV and the maximum energy.
- (3) Accuracy of the beam energy; better than $\sim\pm 5\%$ (absolute) $\sim\pm 3\%$ (relative)
- (4) Amounts of irradiation; 5 \sim 10 electrons/cm² on each detector.

Table 1.

Direct electron events

Event	E (GeV)	θ (rad.)	P_T (GeV/c)	Remarks
303Pb1-27	13	4.5×10^{-2}	0.59	Knee* $P_{r \text{ max.ch.}}'s P_T = 1.1 \text{ GeV/c}$
400W1-32	155	3.3×10^{-2}	0.51	$P_{r \text{ max.ch.}}'s P_T = 2.1 \text{ GeV/c}$
400-W2-4	~ 20	2.2×10^{-2}	~ 0.4	

*

θ (rad.)	$\Delta\theta$ (rad.)	P_T (GeV/c)	\mathcal{L} (m.m)
1.6×10^{-2}	1.08×10^{-1}	1.1	11.9

510

Fig. 1

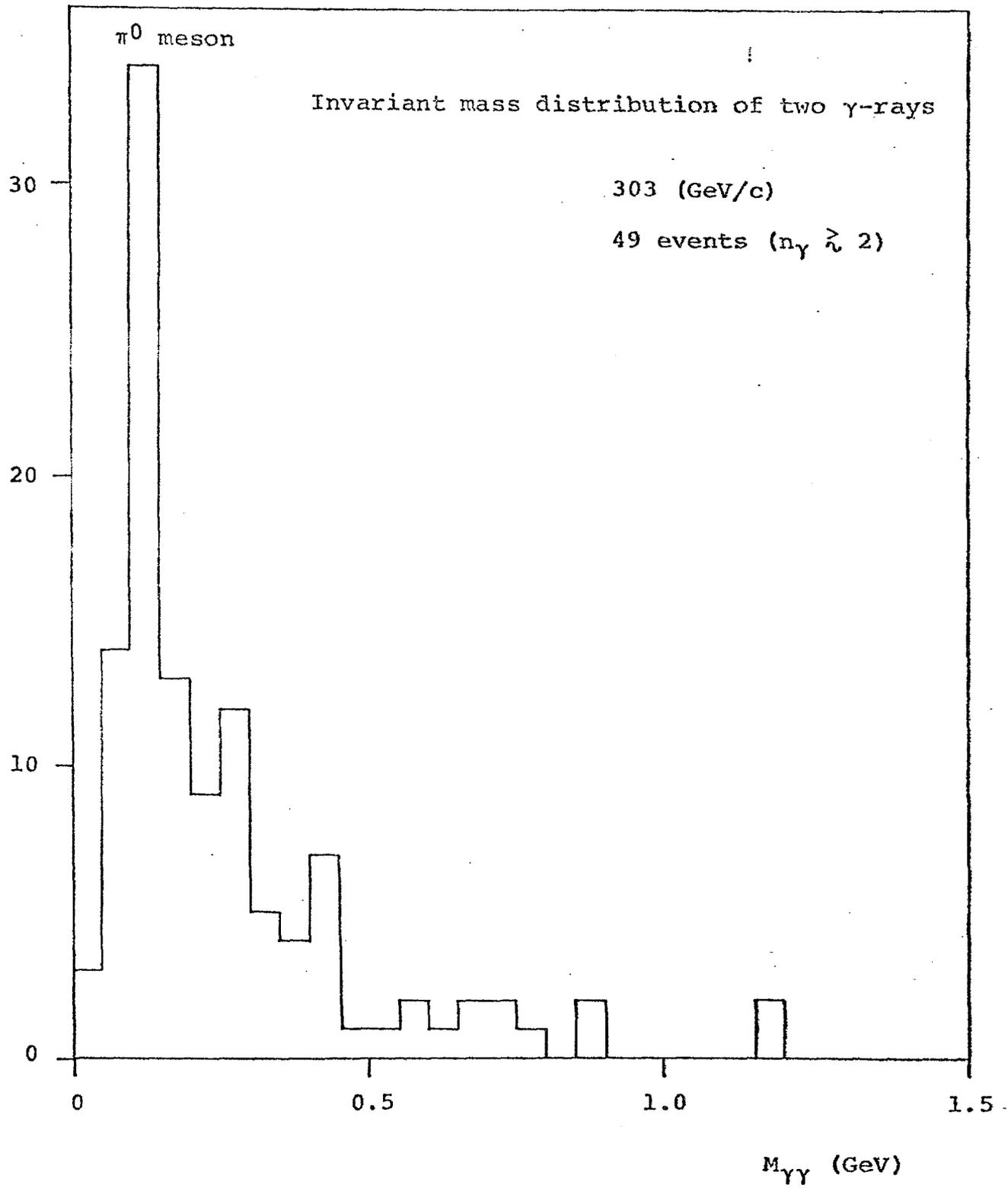


Figure 2.

Emulsion Chamber

