NAL PROPOSAL No. 269

Scientific Spokesman:

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Proposal for 100 GeV/c π^- Exposure in the 15' NAL Chamber

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Letter of Intent for a 100 Gev/c π^- exposure in the 15ft. NAL Chamber.

We hereby request a 100 Gev/c π^- exposure of 200 Kpx in the large 15ft. N.A.L. hydrogen bubble chamber, with 20 particles per expansion, used in a hybrid manner. With a fiducial length of one quarter of the chamber length, and assuming a cross section of 25 mb., this should result in about 300,000 events. Of these, about 25,000 should be 4C fits and about 50,000 1C fits. It seems to be well established, (1) using the Aspen criteria, that fits will not be obtainable above about 20 Gev/c unless the chamber is hybridised by the use of some large downstream magnets and wire chambers. The primary beam momentum needs to be defined to within say 0.05%. We requested £200,000 from the RHEL selection panel for our contribution as one such magnet (out of 4) and a set of 6 wire chamber pairs with computer. Unfortunately the request was rejected, but we are now asking the SRC film analysis panel if they will make an award for travel and subsistence only. If they do, we would contribute as well as we could to the exposure; with NAL providing all the hybridisation rather than the two-thirds envisaged in our request to RHEL. A hybridisation scheme is indicated in the figure (1).

It is intended that the experiment should be a major British effort at Batavia (University College, Imperial College, Liverpool, and the RHEL film analysis groups may wish to join at a later stage), but we would be willing to collaborate with American groups. We would attempt to have one person full-time at Batavia, with others joining for periods of a month during the exposure. Birmingham will have 2 BEBC scanning/rough digitising tables, the video assisted scanning table VAST, and the HPD, as well as 4 film plane digitising machines; Cambridge has SWEEPNIK, and Westfield College will have six rough digitizers and access to the Imperial College HPD. With appropriate portions of this effort the 300,000 events should be measured in about 1.5 years.

The hybridised 15ft. chamber should do a much better job than the 30 inch chamber, especially with regard to strange particles. In the first instance the problems to be studied would be inclusive reactions (2), (3), (4), (5), (6), target and beam fragmentation, (7), and pionisation (8), (9).

A study of factorization and scaling (10), diffraction dissociation and low mass resonances would follow. The physicist effort would consist of the following.

Birmingham: W.P. Dodd, J. Lowe, L. Riddiford, and H.B.Van der Raay;

Cambridge: R.E. Ansorge, W.W. Neale, and J.G. Rushbrooke;

Westfield College: P. Lewis amd P.V. Marsh.

In addition several Ph. D. students would probably be involved.

The exposure is requested as soon as the associated apparatus is ready. A program for studying secondary particle trajectories exists.

(1) Future Development of Particle Detectors toward High Energies, Lecture and Notes by B. French, CERN, 1971.

(2) E.L. Berger, ANL/HEP 7134.

(3) N.N. Biswasetal, P.R.L 26, 1589 (1971).

(4) W.D. Shephard etal, P.R.L. 27, 1164 (1971)

(5) W.D. Shephard etal, P.R.L. 28 703 (1972).

(6) M. Alston-Garnjost etal, Phys. Lett. 39B, 402 (1972).

(7) H. Satz, Rapporteur's Talk at 1971 Amsterdam Conference.

(8) J. Erwin etal, P.R.L. 27, 1534 (1971).

(9) J.H. Friedman etal, P. R,L 28, 191 (1972).

(10) R.P. Feynman, P.R.L. 23, 1415 (1969).

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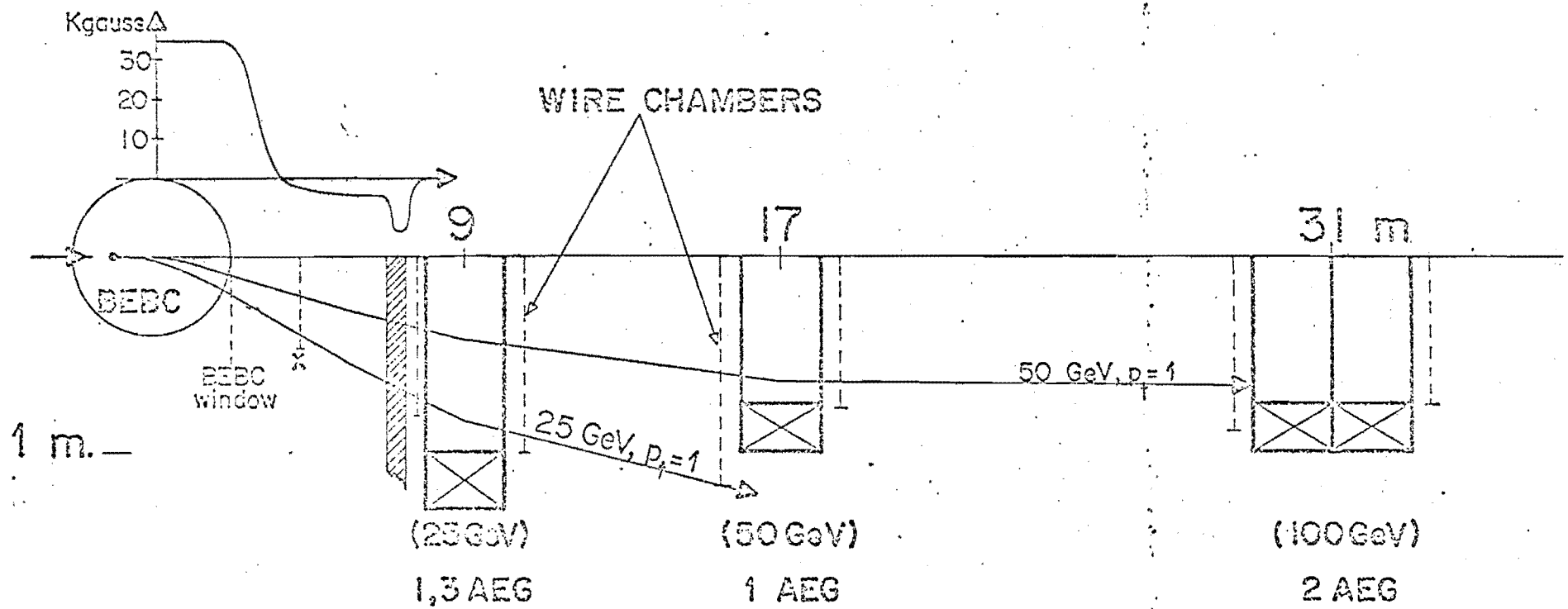
Kgauss Δ
30
20
10
WIRE CHAMBERS
9
17
31 m
BEBC
BEBC window
1 m.
50 GeV, p = 1
25 GeV, p = 1
(25 GeV)
(50 GeV)
(100 GeV)
1,3 AEG
1 AEG
2 AEG

F.2.