CERN/EP/EHS-CC/78-59
12 June 1978

E H S - PART B

L. Montanet

A proposal for part B of EHS (charged particle identification) should be ready for the SPSC of 2 August 1978. An EHS users meeting has been organized on 28 June in order to discuss the results of the tests made on the silica aerogel Cerenkovs SAD, ISIS 1, transition radiation detectors (TRD) and to be informed on the preliminary design made for a forward Cerenkov (FC). It is expected that this meeting will agree on the guide-lines to be given to a working group which will then be writing the proposal.

Fig. 1 shows a sketch of the already approved parts of EHS (parts A and C) and a sketch of what it could be looking like with part B included.

The main points where parts A, C / part B interfer are the following:

1. SAD would have to be shielded against the magnetic field of M1. One envisages to introduce a 20 cm thick steel plate at 2.80 m from the centre of M1 with a hole of 280 x 120 cm. The reactive forces on the coils of M1 are not excessive.

2. A displacement of D_2 upstream if the 240 wire ISIS solution is chosen.

3. A displacement of D_5 downstream to fit in FC and TRD.

4. The amount of material being introduced between RCBC and the FGD.

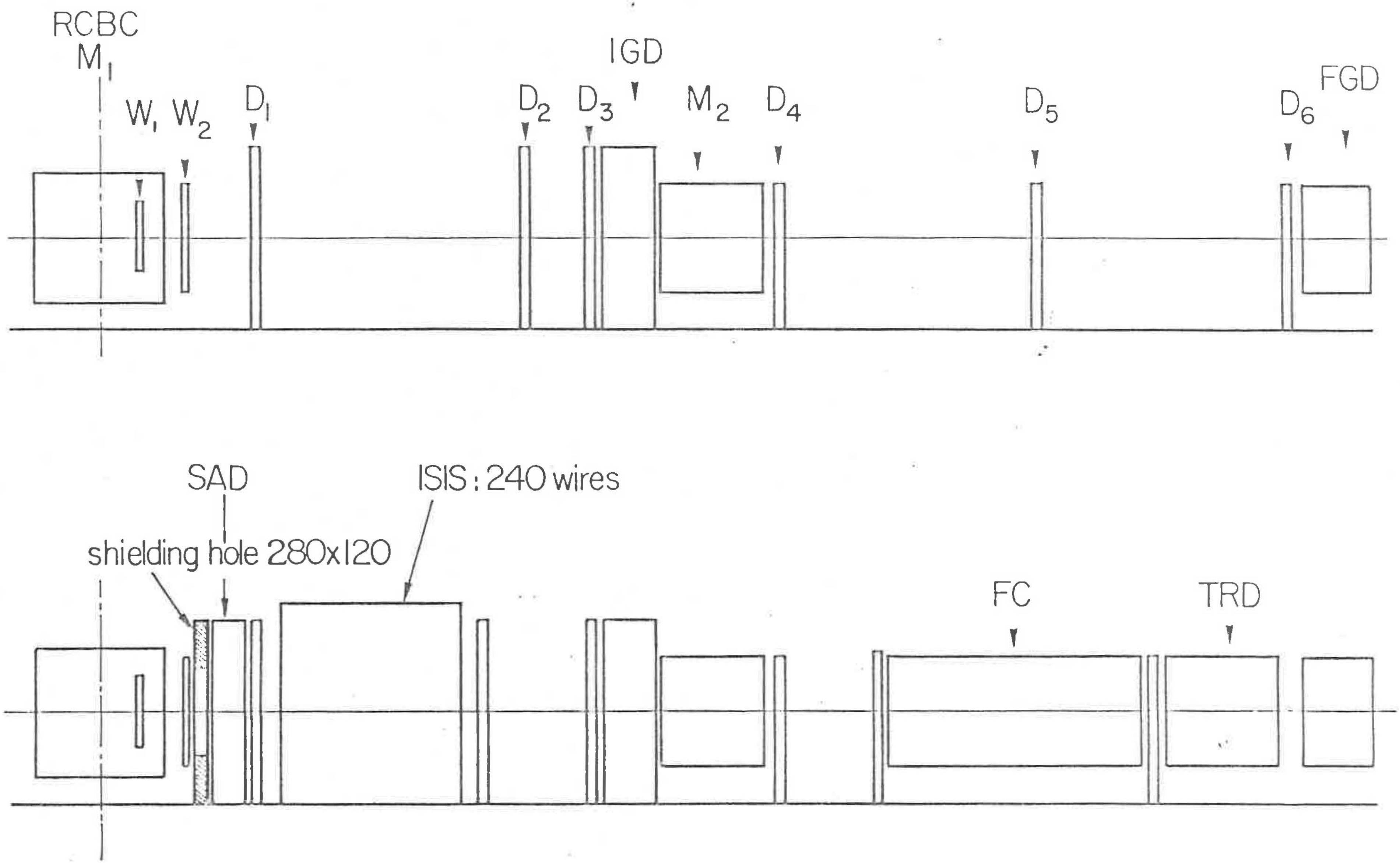
The technical feasibility of SAD has been established with a series of tests performed at the PS by a Belgian - Swedish - CERN team. The magnetic shielding problem is not yet completely solved (it depends upon the final magnetic field map), but should not create an insurmountable problem since the detector could always be shifted 0.50 m downstream if necessary.

LM/fv

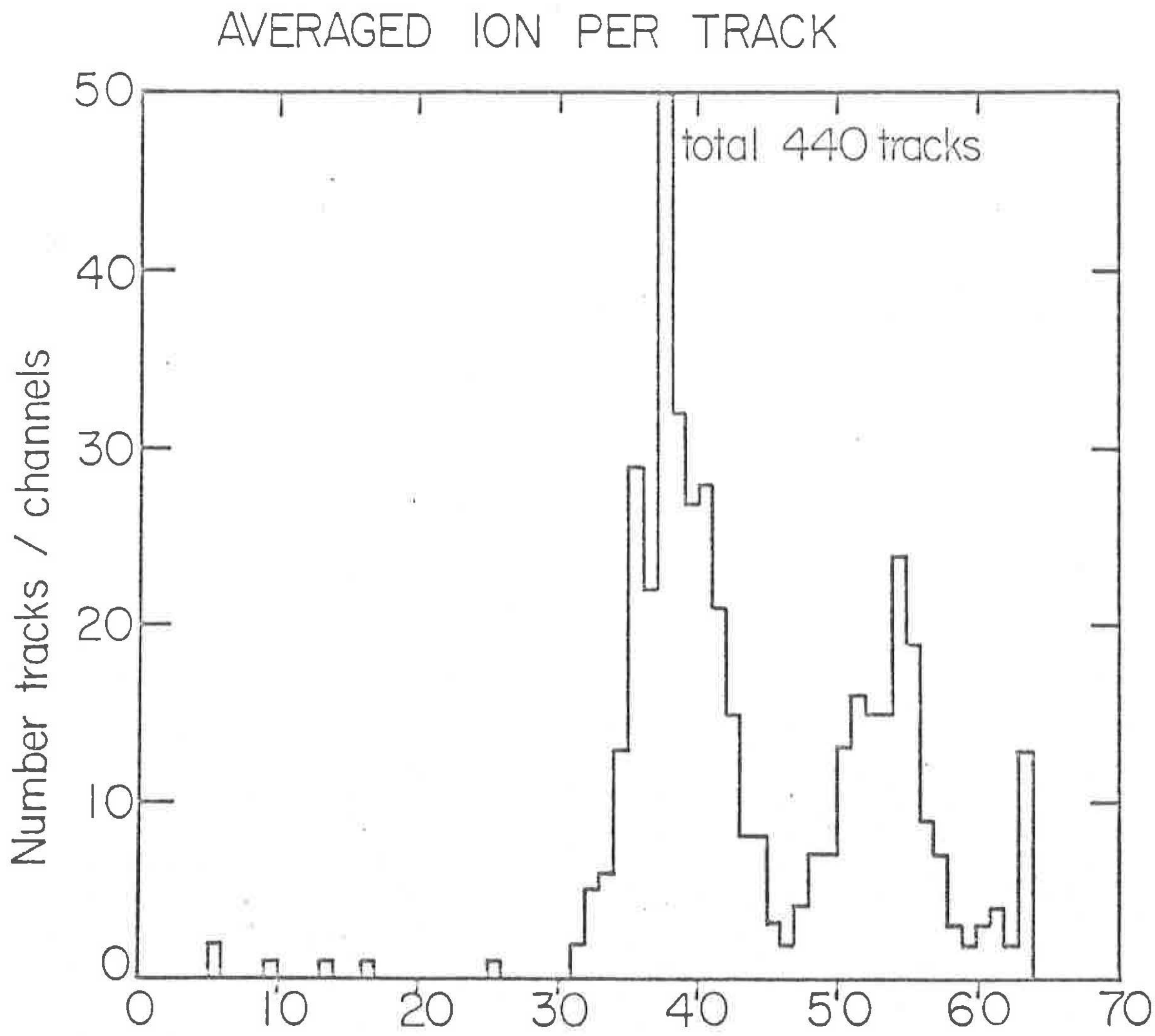
Tests have been performed at RHEL on ISIS 1 (80 wires) - in the last 10 days of Nimrod operation. Data on ionisation have been accumulated with an HT of 120 kV, 70 to 195 cm drift distance and a beam of π^-/e^- at 0.5 and 2.5 GeV/c. It is found that $I_e/I_\pi = 1.46$ (instead of 1.55 calculated) and FWHM between 15% and 20% (instead of 12% calculated). These are very preliminary results which may improve when the analysis has been computed. The gas purification system and electronics seem to work well. More work has to be done on the HT, on instrumentation and on space charge problems. The tests at Nimrod are not sufficient to give an idea of the operational stability of ISIS, but nevertheless a remarkable amount of data has been obtained within the short period available for the tests (Fig. 2).

The FC would very usefully complement ISIS very satisfactorily and would be essential for vetoing $\bar{p}p$ non-annihilation events. It could consist of a 7 to 10 m long counter with $n - 1 = 32 \times 10^{-6}$ to 16×10^{-6} (0.1 to 0.05 atm N_2 or 0.5 atm He). In these conditions, it would separate π (Kp) up to 70 GeV/c and p (Kπ) up to 120 GeV/c. The counter could be made of a cylinder of 2.7 m diameter with two 2 mm thick mylar windows. It would be a 10 to 13 cells Cerenkov.

The TRD would be built at Aachen - a prototype will be tested in the S3 beam in September 1978. It seems possible to build a detector which would have the necessary transverse dimensions (60 cm wide x 160 cm height). The TRD could identify particles (πK/p) above 80 GeV/c.



RCBC
M1
W1 W2
D1
D2
D3
IGD
M2
D4
D5
D6
FGD
SAD
ISIS : 240 wires
shielding hole 280x120
FC
TRD



AVERAGED ION PER TRACK
total 440 tracks
Number tracks / channels
0
10
20
30
40
50
60
70