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STATUS REPORT ON EXPERIMENT R 101

CM-P00063359

Bombay-Bucharest-CERN-Cracow Collaboration

(prepared by J. Gierula, A. Gurtu, and A.J. Herz)

### 1. Results obtained so far

- a) A report on the angular distribution of minimum-ionizing particles has been accepted for publication by Physics Letters; a preprint is attached.
- b) Statistics on electron pairs, coming from the direction of the collision region, are being accumulated in Bombay. The first results should become available within a few weeks.
- c) The analysis of slow particles emitted at large angles with respect to the circulating beams and coming to rest in the emulsions has started in Bucharest. Initial emphasis has been on antiprotons because for kinematic reasons they can be emitted at large angles only from beam-beam interactions. Communication problems have slowed down progress in the interpretation of the raw data, but Friedländer and data are now expected at CERN on 29 August and a report should be ready soon afterwards.

### 2. Experience gathered on utilization of ISR

We are satisfied that we now understand the factors affecting emulsion exposures at the ISR well enough to decide during runs whether the conditions are satisfactory, and to specify what conditions will be needed in future runs if they are to produce the data required.

Details have been discussed with the ISR Coordinator and members of the ISR Department.

### 3. Material gathered up to now

In total, 20 experimental runs have been attempted in I1 since 17 May, of which 6 are known to have been "good". By "good" we mean that there

were good stable beams in both rings for several hours at least, and that the beam-beam interaction region is clearly distinguishable in the angular distribution of minimum-ionization tracks.

As the speed with which data can be obtained depends on the number of wanted tracks and events per unit area of emulsion as well as on the signal-to-background ratio, long runs with high luminosity provide good statistics more rapidly than exposures to a lower total flux with the same proportion of background. Of the 6 "good" runs, 4 were long (more than 6 hours) and with high luminosity (more than 1.5 A in each ring).

In these runs small nuclear-emulsion stacks and plates were exposed at angles between 30° and 90°, so that a fair amount of useful material has been accumulated. However, as we were still in the early stages of gathering experience, we did not commit large quantities of emulsion and we agreed to carry out our exposures with the magnetic shield (needed to allow experiment R 102 to operate) in position. This shield is a major source of background tracks, especially in the case of measurements at small angles with respect to the beams.

#### 4. Plans for the near future

We believe that we are now ready to conclude the first phase of our exposures with a two-week series of six runs in which we expose larger quantities of emulsion and in which we attempt to optimize the conditions. After these runs we should like to analyse the material before carrying out further irradiations at the ISR.

For these two weeks we request the following conditions:

- a) The energies should be 15 or 22 or 26 GeV; not 10.5 GeV or any energy new to the ISR. The current should not exceed 2.5 A in either ring.
- b) The shielding for experiment R 102 should be removed.
- c) In three of the runs we should like to be entitled to ask for a dump of Ring 2 after 85% of the planned length of the run in order to obtain a background exposure. We would not request this dump if the run in question is not a good one from our point of view.

- d) During setting up we should like to be entitled to ask for dumping and restacking of the beam in either ring if it is producing inacceptably strong background flashes in I1.
- e) After the general luminosity/optimization procedure, and after all other intersections have settled their optimum vertical positions, we should like to be entitled to request a rapid (10s per point) "mini luminosity" measurement with not more than six points.

##### 5. Long-term plans

During the first half of 1972 we should like to be able to return to the ISR to make exposures to pursue those lines of our work for which the emulsion technique is suited as well as, or better than, other methods being used at ISR. The facilities we shall need will be specified on the basis of the results obtained, they will almost certainly include a thin vacuum chamber and we are sure that they will be neither complicated nor very expensive.