

Ref.:

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Mr. Jacques LEFRANCOIS

## M E M O R A N D U M

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G. Bellettini, ISF  
K. Potter, ISRC

To/A : C. Fabjan, ISR Coordinator

From/De : T. Del Prete, Spokesman, Experiment R210

Subject/: Running requests for 1983  
Objet

At the outset of Experiment R210, we requested from the ISRC a total of 20 stacks, two stacks each with  $\bar{p}p$  and  $pp$  beams at each of the five ISR energies with the Terwilliger scheme of source-size reduction. As you know, these requests were approved by the Committee.

So far, in the thirteen months since the start of the ISR  $\bar{p}p$  program, we have had only four  $\bar{p}p$  stacks: two at 26 GeV/c, the first of which could not be used to obtain publishable data and the second of which was still very poor for what regards background; one stack at 31 GeV/c; and one at 15 GeV/c.

In order to complete the study outlined in our proposal, we need more  $\bar{p}p$  and  $pp$  running time in 1983. We are very well aware of the difficulties that must be faced by the ISR community as a whole in the forthcoming months, and have condensed our requests to the minimal program outlined and justified below.

To perform a measurement at any energy, we need about 1 week of running broken down as follows:

- 24 hours of  $\bar{p}$  accumulation in the AA.
- 120 hours of  $\bar{p}p$  physics with about 5 mA against 5 A, TW on, fine adjustment to minimize the  $p$  beam background, and the usual steering exercises.
- 24 hours of  $pp$  physics for comparison data.

Our minimal request is as follows:

Priority 1: One week at 22 GeV/c

The total cross-section data we have so far indicate that  $\sigma_{tot}(\bar{p}p)$  and  $\sigma_{tot}(pp)$  both rise as  $(\ln s)^2$ , faster than previously thought, but only the two higher-energy points give any information on the precise  $s$  dependence of the total cross-section -- the lower-energy point is at the same level as the top Fermilab point. The 22 GeV/c point is absolutely necessary to refine our measurement of the energy dependence.

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Priority 2: One week at 31 GeV/c

As you know, our present data at this energy deviate substantially from earlier ISR data. It is imperative that we repeat the points at the highest ISR energy to check their reproducibility. Also, our elastic detector developed a malfunction during the first stack, and we have been unable to extract the elastic cross-section from the data. This is especially important at 31 GeV/c: an independent, optical-theorem calculation of  $\sigma_{\text{tot}}$  is an excellent check of the total-rate measurement.

Priority 3: One week at 26 GeV/c

The earlier runs - the first pp experience in the ISR - were very noisy and suffered from low luminosities. The data have been very difficult to analyze, and the results obtained are not of the same quality as those we have at the other energies.

Priority 4: One week at 15 GeV/c

The differences between pp and  $\bar{p}p$  reactions are greater at lower energy, and it is easier to study "annihilation" effects at this energy. (A week at 11 GeV/c would be even better, but we understand the overwhelming machine problems at this setting, and have avoided making this request.) Our data on secondary distributions give some indication of unanticipated effects, but we need higher statistics for clarification.

In summary, we request about four weeks of dedicated ISR operation and four days of AA operation.