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## EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

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M e m o r a n d u m

To : The Electronics Experiment Committee  
From : M. Conversi, T. Massam, T. Muller and A. Zichichi.

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A progress report on the "Papep" experiment is being prepared and will be ready by the end of November.

This memorandum contains only some of the relevant information on the status of this experiment. It is sent with the purpose of obtaining for "Papep" the official priority currently given to the so-called "scheduled" experiments.

1. A large amount of experimentation has been carried out at the  $q_{2a}$  beam using the apparatus proposed in the preliminary project sent to some members of the NERC (Professors Bernardini, Preiswerk, Van Hove and Weisskopf) on March 14, 1962.
2. This experimentation has shown that the background of events simulating the process  $pp \rightarrow ee$  can be kept well below (more than 10 times) the expected rate of genuine events, if the cross-section for such a process has the Fubini extrapolated value.
3. The same conclusion is reached for the background simulating the other rare annihilation mode  $\bar{p}p \rightarrow \mu\bar{\mu}$ .
4. The feasibility of both experiments is therefore now based on well-established experimental results. To carry out the experiment in a reasonable time it is of course essential to have available a good  $\bar{p}$  beam.
5. The  $m_2$  beam recently constructed yields antiprotons with negligible  $\pi^-$  contamination. So far no effort has been made to optimize its  $\bar{p}$  rate. Since a fairly large  $\pi^-$  contamination can be tolerated in our experiments, it is believed that a rate of 5,000  $\bar{p}$ /burst can be obtained from  $m_2$  at an antiproton momenta of 2.5 GeV/c. Notice that this rate is close to that already obtained by Fidencaro in the old low-energy separated  $\bar{p}$  beam.
6. The rate of  $\bar{p}p \rightarrow e\bar{e}$  events expected at 2.5 GeV/c momentum on the basis of 5,000  $\bar{p}$ /burst at a repetition rate of 0.3 burst/sec is from 2 to 3 events per day.
7. We wish to emphasize that this rate will be obtained with our present set-up which has been constructed with great economy (both in money and time) using, as far as possible, already existing instrumentation.

8. We suggest using our present set-up on the  $m_2$  beam in order to check that the rate of recorded events is not much less than the one expected on the basis of the Fubini extrapolated cross-section. We believe that this check must be done before spending time and money on a more elaborate and powerful set-up capable of bringing the expected rate of events to the order of one per hour with the above-mentioned beam.
9. Some experimentation is now needed on the  $m_2$  beam in order to achieve the best beam conditions for the "Papep" experiment. We are ready to carry out these measurements with the support of Dr. J.M. Perreau who has kindly agreed to help us. We estimate that two groups of 12 shifts, separated by an interval of about one week, are needed to perform the necessary experimentation on the  $m_2$  beam. We trust that this machine time can be allocated to us in the immediate future, possibly on a parasiting basis.
10. At the moment our apparatus is installed in the  $q_{2a}$  beam. We would like to remain there as a parasiting group until we move it to the  $m_2$  beam. This is essential in order to check, over a long running time, the over-all stability of our apparatus.

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