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M E M O R A N D U M

To : PSCC

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Subject: Intent for an experiment on spin effects in the $\bar{N}N$ system at LEAR after ACOL.

Experiment PS172 at present is measuring the differential cross-section and the polarization parameter for the two-body annihilation channels $\bar{p}p \to \pi\pi$ and KK and for the elastic channel, in steps of the $\bar{p}$ momentum, having as a goal the search of s-channel resonances. Even if many resonances are found in this experiment, it seems unlikely that their couplings to $\bar{N}N$ can be determined, since the information on the elastic channel alone is not sufficient to disentangle the complicated spin and isospin structure of the $\bar{N}N$ system.

The Geneva and Trieste partners of the SING Collaboration propose therefore to continue after ACOL the study of the $\bar{N}N$ system, measuring the differential cross-section and the polarization parameter of the $\bar{p}p \to \bar{n}n$ and possibly $\bar{n}p \to \bar{n}p$, for various momenta of the incident particles. Because of the absence of the Pomeron, whose exchange dominates the elastic channel, the charge-exchange channel is sensitive to the presence of small resonant amplitudes. The $\bar{n}p \to \bar{n}p$ is a pure I=1 isospin channel, and the experience of PS178 will be quite helpful in planning measurements of spin effects.

The large $\bar{p}$ intensity foreseen in the ACOL era makes the rates for these two channels quite interesting and adequate for polarization measurements. We intend therefore to measure $\bar{p}p \to \bar{n}n$ and $\bar{n}p \to \bar{n}p$ with a solid polarized target (some data might also be taken in the elastic channel). Discussions are going on with other groups interested in such a program, and a proposal will be submitted to this Committee as soon as possible. While it is not excluded that the present polarized target installation be used, we are considering the possibility of using an existing larger magnet (PT7), which can accommodate a target four times longer than the existing one.