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LETTER OF INTENTION FOR A $(\pi^-,2n)$ EXPERIMENT ON ^{16}O

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$(\pi,2N)$ experiments with good resolution are expected to provide important information about the distribution of two-hole states, the momentum distribution of nucleon pairs from different shells and about nucleon-nucleon short-range correlations[1].

Several counter experiments of this type have been carried out over the past years[2-6] but some inconsistencies exist, and because of the poor statistics and the low resolution obtained many questions are still unanswered. With the present beams there is no chance for drastically improving both energy resolution and statistics. It seems possible, however, to improve the statistics to such an extent as to identify reliably the individual two-hole states. Their relative intensities[1] and the angular correlation of the neutron pairs from the different states would yield new important information[7].

We intend to study the $(\pi^-,2n)$ reaction on ^{16}O with very large counters ($3\ m^2$ area, 16 cm thickness). Stopped pions from the 70-MeV beam from the SC will be used. The counters will be at a distance of 6.5 m at opposite sides of the target and a coincidence rate will be obtained of 1 count per 10^5 stopped pions. The momentum resolution for each neutron will be 5% or better. The counters are position-sensitive and the angular correlation of the neutron pairs can be determined with an accuracy of 2 degrees. A possible arrangement would be one in which the neutron counters are placed close to the north and south walls of the neutron hall. This should avoid spatial interference with other experiments. The neutron counters and the on-line computer exist already. They have been successfully used in the Pisa-Karlsruhe experiment at the PS, and will become available to us in the second half of 1971.

The need of approximately 40 shifts as main users plus some parasitic time for testing the set-up is expected for this first part of the experiment, which should be carried out before the SC shut-down.

After the improvement of the machine and with the experience gained in the first part a continuation of the experiment is planned with improved energy resolution. For this purpose smaller neutron counters with a considerably better time resolution are already being developed at Karlsruhe.

We intend to submit a detailed proposal to the next meeting of the Physics III Committee.

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