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Letter of intent to the SPSC

Study of multihadron events in a hybrid detector at the SPS

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We intend to participate at an experiment proposed by the CERN-Orsay-Oxford-Rutgers-Stockholm Collaboration (CERN/SPSC/75-15) to study multihadron events in a hybrid detector at the SPS. Very little is known so far on the dynamics of strong interactions. Multihadron production, being the dominant process at high energies, still needs detailed investigations. The rapid cycling bubble chamber as a powerful target detector, implemented by particle detection and identification in forward direction, will provide us with an adequate tool to study these processes. As outlined in the above mentioned proposal, an extensive physics program should be carried out.

We aim in particular to further improve the particle detection capability of the detector by implementing the set-up with γ -detection facilities. An addendum to the proposal has already been prepared by a group of physicists under our participation. It is foreseen to provide for high resolution leadglass-detectors in the forward direction and systems for γ -tagging at larger angles so to observe about 2/3 of all produced π^0 's. γ -detectors not only will improve essentially the possibility to study 4C-fit events but also provide an easy trigger for a certain class of events, where the major fraction of the primary π^- -energy is carried over to π^0 's, like pion diffraction into $\pi^- \pi^0 \pi^0$ or charge exchange reactions of the kind $\pi^- p \rightarrow \pi^0 X^0$. Study of other processes

⁺Presently at CERN

like multiperipheral ordering as well will profit from observation of π^0 's.

The Heidelberg-group intends to participate in design and construction of the γ -detectors. A part of the forward γ -detector should be provided by us. For data-evaluation a PEPR-system is available at Heidelberg, the measuring capacity being estimated to about 50 000 events/year.