

ORGANISATION EUROPÉENNE POUR LA RECHERCHE NUCLÉAIRE
EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

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Professor R. Klapisch
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Your reference 81-24/P 27 Add.1
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Dear Professor Klapisch,

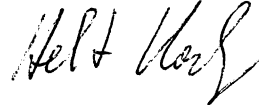
The main point of our LEAR proposal P 27 was the trapping of antiprotons in an inhomogeneous magnetic field (cyclotron trap). It allows to form the $\bar{p}p$ systems at very low pressures (several Torr) and facilitates thus - because of the absence of Stark-mixing - the detection of the $\bar{p}p$ X-rays. Further studies of the cyclotron trap have shown that it is an extremely valuable instrument, not only for X-ray measurements, but also for the search for Baryonium states below threshold ($\bar{p}p \rightarrow \gamma B$) and for annihilation reactions.

The overwhelming amount of $\bar{p}p$ reactions at low gas pressures will occur from atomic p-states. All previous data on the reaction $\bar{p}p \rightarrow \gamma B$ were taken on LH₂ targets, where the s-absorption dominates. Qualitatively different results might show up in this case because Baryonium states of higher angular momentum can be populated. Furthermore, the amount of p-wave absorption in the $\bar{p}p$ system as function of the pressure in the hydrogen gas can be studied, looking at the reaction $\bar{p}p \rightarrow \pi^0 \pi^0$.

A combination of high energy resolution detectors for gammas (modular NaI detector, successfully used in our present experiment) and X-rays (Si(Li) detectors) and the use of a low pressure gaseous target is only possible with the cyclotron trap. The spatial separation between moderator and annihilation volume and the timing characteristics of the system allow for a very efficient reduction of the background, originating usually in the moderator or from annihilations in flight.

As soon as the data analysis of our present experiment on Baryonium (PS 161) is finished, we would like to submit a proposal to the PSCC following the lines indicated above. That will probably be the case for the May session of the PSCC. The authors would belong to a Karlsruhe-Strasbourg collaboration. The floor space needed for this experiment would slightly exceed the space needed for P 27.

Yours sincerely,

A handwritten signature in cursive script, appearing to read 'Helmut Koch', written in dark ink.

Helmut Koch