

7th March, 1974

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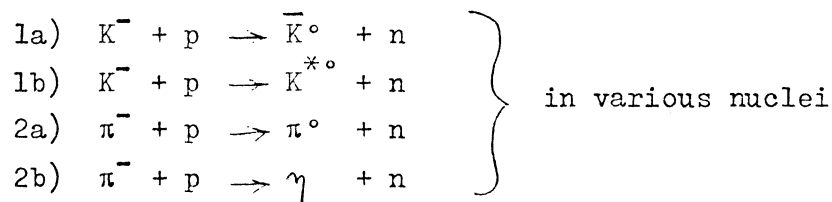
To: The Chairman of the EEC

From: W. Brückner, M. Faessler, K. Kilian, U. Lynen,
B. Povh, H.G. Ritter, K. Schröder, A. Bamberger -
Heidelberg Group.

Subject: Letter of Intention for an experiment on Incoherent
Production of Resonances on Nuclei.

The coherent production of meson resonances in nuclei has been studied extensively and has yielded among other things the total cross sections for ϱ - meson from photoproduction in nuclear matter¹⁾. The coherent production of π , 3π , 5π systems has shown the equality of the total cross sections to be independent of the final state and therefore it seems that those systems behave similarly in nuclear matter²⁾. Similar experiments on incoherent production of resonances on nuclei have not been performed except for a measurement of the π^0 and η total cross sections³⁾ which was not accurate enough to give pertinent information. A certain lack of interest in resonance production on nuclei might come from the belief that the usual Glauber theory does not describe incoherent processes as accurately as coherent ones. This has however, not been tested experimentally.

We, therefore, propose to study the following pairs of reactions:



The aims of these studies are the following:

Firstly to test the Glauber theory for incoherent processes by the reaction 1a) and 2a). Secondly, to compare the reactions 1a), 1b) and 2a), 2b) in order to obtain an almost model independent deter-

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mination of the K^{*0} and η cross sections. Finally, to compare the reactions 1a) and 2a) with either the reactions $K^+ + n \rightarrow K^0 + p$, $\pi^+ + n \rightarrow \pi^0 + p$ or $K^0 + n \rightarrow K^- + p$ in nuclei. This would be a very sensitive test of the charge and mass distribution in nuclei⁴⁾.

The experiment should be done at about 10 GeV/c. The experimental method (see Fig. 1) relies on a p_T trigger for the reaction 1a), 1b) using the correlations of H1 and H2 signalling events with a fixed p_T . Since the p^{cm} for the two body decays of K^0 and K^{*0} are rather similar (207 MeV/c and 290 MeV/c) the same settings of H1, H2 and the magnet can be used.

For the reactions 2a), 2b) a set up as shown in Fig. 2 is envisaged. The targets are shielded by anticounters and the 2 gamma decays of π^0 and η are used to signal the production of the meson. With the exception of the gamma counter, the components for the experiment such as the drift and wire chambers, counters and computer, already exist. The type of gamma counter has to be decided.

We could start the experiment in 1975 in a high energy beam in the East Hall. We intend to submit a proposal with more detailed calculations after clarification of the beam schedule in 1975.

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2. Bemporad et al., Nuclear Phys. B33, 397 (1971).
3. Guisan, Bonamy, Le Du, Paul, Nuclear Phys. B32, 681 (1971).
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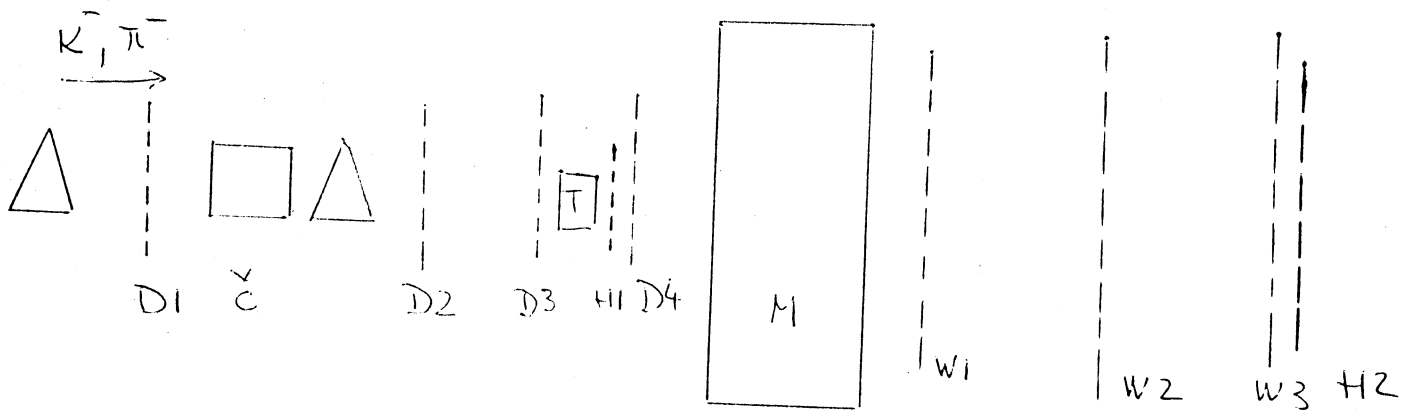


FIG. 1

- D1, 2, 3 Drift chambers
- W1, 2, 3 Wire chambers
- H1, 2 Hodoscope
- C Čerenkov counter

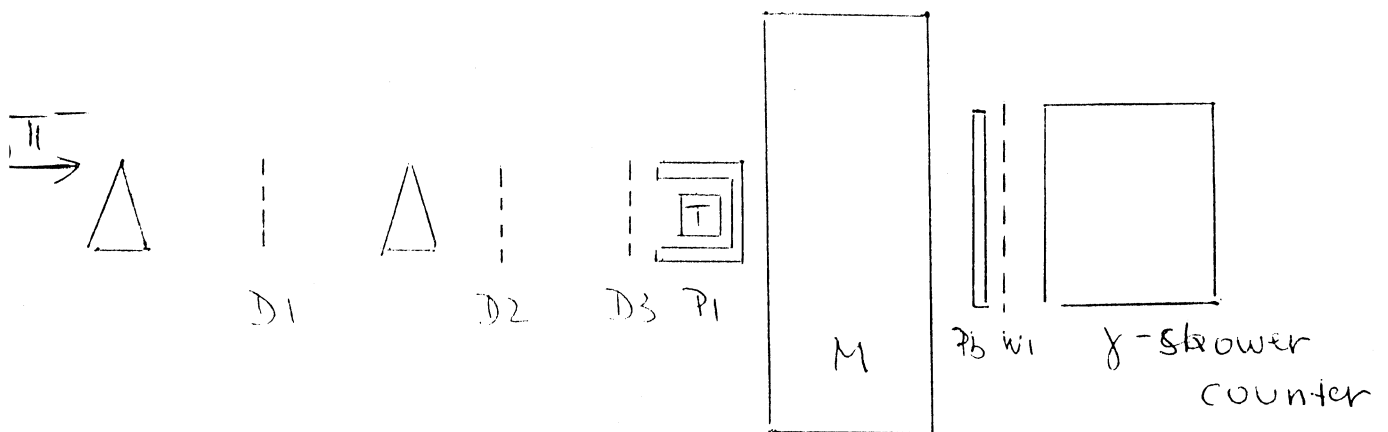


FIG. 2

- D1, 2, 3 Drift chambers
- W1 Wire chamber
- P1 Plastic counter