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PHYSICS I  
ELECTRONICS EXPERIMENTS COMMITTEE

LETTER OF INTENTION

SERPUKHOV EXPERIMENT

by

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LETTER OF INTENTION

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TO : Members of the CERN E.E.C.

FROM : Milano Group (G. Bellini, M. di Corato, P. F. Manfredi, V. Varoli, G. Vegni)

SUBJECT : Serpukhov Experiment

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● We are planning an experiment on coherent interactions to be performed at Serpukhov accelerator.

The first part of this experiment concerns the measurement of  $\pi^-$  total and differential cross sections for coherent production of multipion systems on silicon nuclei:

$$\pi^- + \text{Si} = n\pi + \text{Si} \quad n \geq 2$$

at various energies up to 60 GeV.

The study at various energies of total cross sections and  $t$  distributions in different multiplicity channels allows to investigate the production mechanism and its selection rules. As it is well known, this has been done, up to now, only in a limited energy range below 18 GeV.

The set-up will essentially consist of:

- 1) The beam definition system.
- 2) A "live" target consisting of 10 silicon detectors, of thickness between 100 and 200  $\mu\text{m}$ , assembled in a telescope arrangement and with 10 independent pulse processing chains.
- 3) A decisional Charpak-chamber, which counts the number of charged secondaries and triggers the system, when it is crossed by at least two particles.

4) A system of anticoincidence counters, placed around the target, in order to reject the events with large angle charged secondaries and gammas.

5) A sandwich of scintillators plus lead layers anticoincidence counters or a lead spark chamber which reject the events with  $\gamma$  emitted in the acceptance solid angle.

As we have recently shown (Dubna Conference on High Energy Physics Instrumentation - sept. 1970) with such a target it is possible to obtain a highly purified statistic of coherent events, by rejecting the incoherent ones. On the basis of recent developments on detector technology and of pulse processing chain, it is possible to achieve an overall resolution of 40 KeV for 100  $\mu$ m thick detectors (70 KeV for 200  $\mu$ m), which includes electronic noise, Landau fluctuations and uncertainty on interaction location inside the detector. With this resolution we should be able to investigate the possible presence of dips in the differential cross sections.

We are in touch with a Polish-Russian Group of Dubna (leaders drs. Czyżewski and Tsyganov), which has asked for an experiment on coherent interactions at Serpukhov. A private agreement for a collaboration has already been reached.

A second part of the experiment could be the study of Coulomb coherent production of two body systems on high  $Z$  target, using the magnet plus wire spark chambers spectrometer now at Serpukhov at disposal of Tsyganov group.

A detailed project of this experiment is being prepared and will be sent to the E.E.C. Committee of the CERN.