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SPS PROPOSAL

Study on Event Structures of 200 GeV/N ^{32}S Interactions with Nuclei by the Magnetic Emulsion Spectrometer at the CERN SPS

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SUMMARY

We propose to study the heavy ion interaction induced by ^{32}S ion with 200 GeV/N at the CERN SPS, employing the magnetic emulsion spectrometer. The main aim of this proposal is the search for anomalous event structure which may be caused by the phase transition and the investigation of the space time structure of nuclear collision by the pion interferometry, through the charged particle exclusive measurement.

The magnetic emulsion spectrometer (Magnetic ESSPER) has been developed successfully by our group as a detector to measure the momenta of almost all charged secondaries coming from high energy nuclear collisions, using beams at KEK and Saclay.

We applyed the magnetic ESSPER technique to the heavy ion experiment E826 at the BNL AGS, and exclusive analyses of ^{28}Si central collisions with W targets are proceeding at present. In this analysis an interesting event is obtained, which seems to show the jet or flow like structure(see the back).

As an evolution of the BNL/E826, we plan the experiment at the CERN SPS with higher beam energy, which will provide larger energy density than it at BNL.

This proposal requires the 10^6 sulfur ions of 200 GeV/N in all with the beam intensity of $\sim 1\times10^4$ ions/spill for the exposures of ten emulsion spectrometers(one spectrometer has the dimension of around 10cm×10cm×10cm) in the magnetic field, which strength is desirable to be 2.5-4.0 Tesla. 3×10^5 sulfur ions with 200 GeV/N in all are also necessary with no magnetic field as reference beams for the correction of the chamber geometry. For these exposures the beam profile is required to be approximately uniform in the cross section of $\sim 5\times5$ cm^2.

We request 3 hours of the SPS heavy ion running for the whole exposures, including the time necessary to locating and exchanging the ESSPERs.

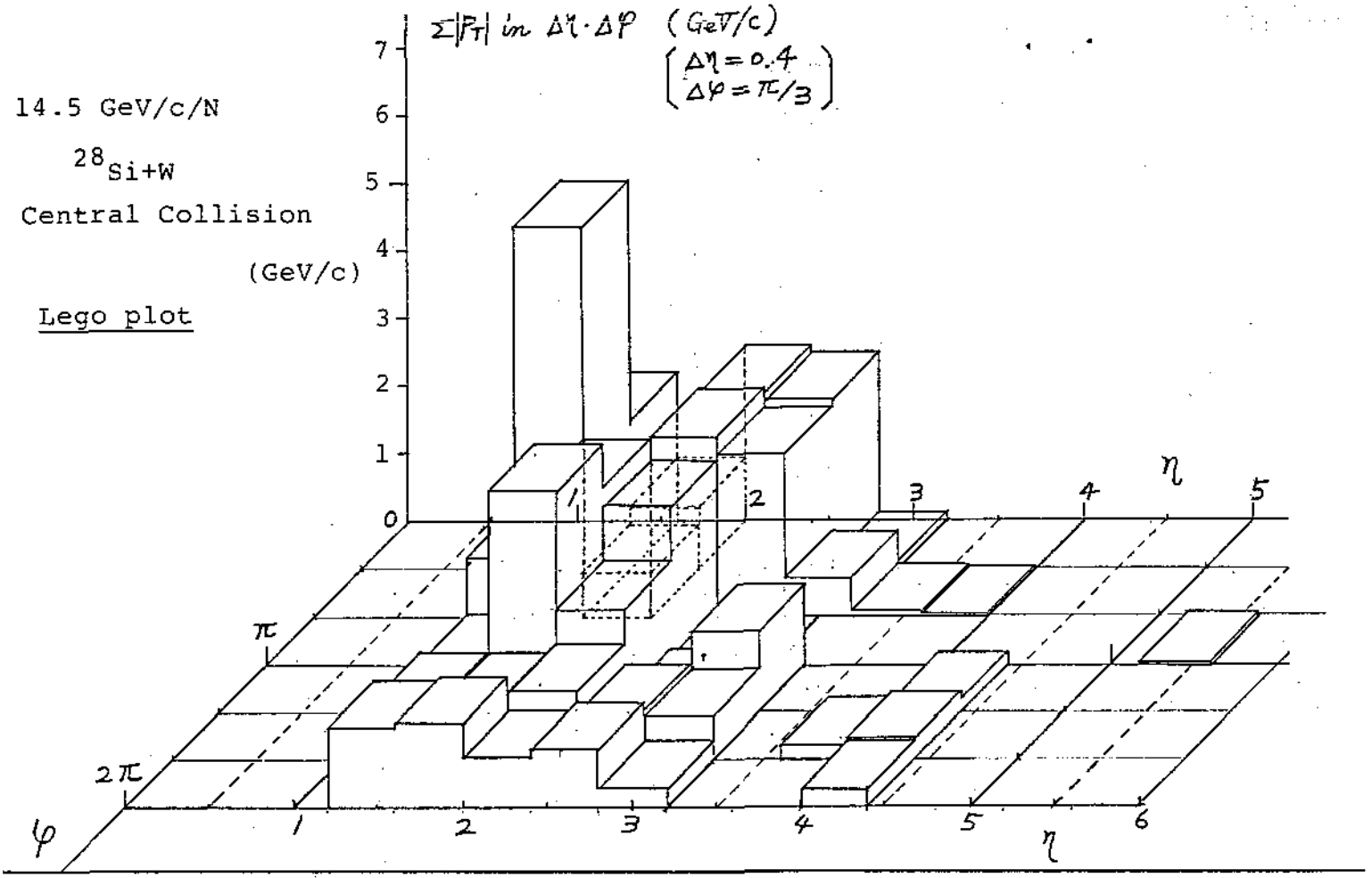
The exclusive analyses of one hundred central collisions are possible by our group in a year, using the computer aided microscopic systems.

14.5 GeV/c/N

^{28}Si+W

Central Collision

Lego plot



tall tower --- tower having $\Sigma|P_T| \geq 2$ GeV/c

n_{ch}(in tower) and P_T distributions for tall towers(bump) and kid towers in the central rapidity region($1.2 \leq \eta \leq 2.8$)