EMU08/E847/E875 - Particle Production

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Physics Goals:	Particle production at relativistic energies
Beams:	^{32}S and ^{16}O at 200A GeV
	^{16}O at 60A GeV (EMU08)
	^{28}Si at 14.5A GeV (E847)
	^{197}Au at 10.6A GeV (E875)
Targets:	H, C, N, O, Ag, Br (emulsion)

Physics Summary

We investigated the multifragmentation of ^{197}Au at 10.6A GeV in nuclear emulsion. A power-law behavior has been found in the charge distribution of fragments with $Z = 1 - 25$. A rise and fall in the average multiplicity of IMFs is also observed in the data. Two independent souces of helium particles are found through the study of their transverse momenta (P_t): one source with low P_t and the other one with high P_t. The high P_t helium particles should give rise to a bounce-off effect, and consequently the flow of nulear matter at AGS energy. This is what is exacly found in for the fragments of charge $Z \geq 2$ in ^{197}Au-emulsion collisions using the technique of azimuthal correlation function of particle pairs.
Through the technique of multifractal G_q moments, we studied the dynamical fluctuations of produced shower particles in ^{197}Au-emulsion interactions. Multifractal structures are revealed in these data. The results are compared with those of ^{32}S and ^{28}Si data obtained from SPS and AGS, respectively. For the ^{197}Au and ^{28}Si ions, an interesting observation, known as the squeeze-out effect, has been made from the azimuthal angle distributions of charged pions with respect to the reaction plane as determined by the projectile fragments of charge $Z \geq 2$. We did not find this effect for the ^{32}S beam at 200A GeV from the SPS.

Selected Publications

"Intermediate-Mass-Fragment Emission by ^{197}Au Projectile at Relativistic Energy in Nuclear Emulsion" P. L. Jain, G. Singh and A. Mukhopadyay, Phys. Rev. **C**, August 1994.

"Production of Helium Fragments in ^{197}Au-Emulsion Collisions at 10.6A GeV" G. Singh and P. L. Jain, Z. Phys.**A4** (1994) 99-104.

"Collective Flow by the Azimuthal Correlation of Projectile Fragments in Relativistic Heavy Ion Collisions" G. Singh and P. L. Jain, Phys. Rev. **C49** (1994) 3320 -3323.

"Squeeze-out of Pion Emission in Relativistic Heavy-Ion Collisions" P. L. Jain and G. Singh, Mod. Phys. Lett. **A9**, (1994) 1445-1452.

"Nuclear Collectice Flow in ^{197}Au-Emulsion Interactions at 10.6A GeV" P. L. Jain, G. Singh and A. Mukhopadyay, submitted 1994.