WA80 - Large Acceptance Photon, Meson, and Baryon Production

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Physics Goals:	π^0, η, prompt γ spectra and target fragmentation
Beams:	S, O, p at 200 AGeV and O, p at 60 AGeV
Targets:	C, Al, S, Cu, Ag, Au

Physics Summary

The aim of the WA80 experiment is to study the reaction mechanisms of nuclear collisions in particular by detecting photons in a 3800 module lead glass spectrometer. Transverse momentum spectra of photons, π^0 and η at various centrality conditions have been extracted for $0.2 \leq p_\perp \leq 4.4$ GeV/c. The data show power-law shaped spectra and $m_\perp$-scaling is observed within the experimental uncertainties. The η/π^0-ratio is somewhat enhanced as compared to the values found in pp collisions. An uncertainty of 7% is reached in the γ/π^0-ratio at $0.5 \leq p_\perp \leq 2.5$ GeV/c. In a preliminary analysis a photon excess of 10-15% is observed over known hadronic sources.
One and two-dimensional intermittency has been studied by using the streamer tube detectors read out by 40,000 pads. No intermittency signal beyond that produced by folding the Fritiof event generator with a detailed model of the detector is observed. The target fragmentation region has been investigated by measuring pp, $\pi^+\pi^+$, as well as many particle azimuthal correlations. The data consistently suggest that the full target nucleus participates in the reaction and that pion absorption effects play an important role in the interactions with heavy target nuclei.

Selected Publications

"Multiplicity and Pseudorapidity Distributions of charged particles from ^{32}S induced interactions...", R. Albrecht *et al.*, Z. Phys. **C55** (1992) 539-548.

"Intermittency and Correlations in 200 AGeV S+S and S+Au collisions", from ^{32}S induced interactions...", R. Albrecht *et al.*, Phys. Rev. **C50** (1994) 1048-1064.

"Distributions of transverse energy and forward energy in ^{16}O- and ^{32}S-induced collisions...", R. Albrecht *et al.*, Phys. Rev. **C44** (1991) 2736-2752.

"Bose-Einstein correlations in the target fragmentation region in 200 AGeV ^{16}O+nucleus collisions", R. Albrecht *et al.*, Z. Phys. **C53** (1992) 225-237.

"Upper Limit for Thermal Direct Photon Production in Heavy-Ion Collisions at 60 and 200 AGeV", R. Albrecht *et al.*, Z. Phys. **C51** (1991) 1-10.

"Transverse momentum distributions of neutral pions from central and peripheral 16O+Au collisions at 200 AGeV", R. Albrecht *et al.*, Z. Phys. **C47** (1990) 367-375.

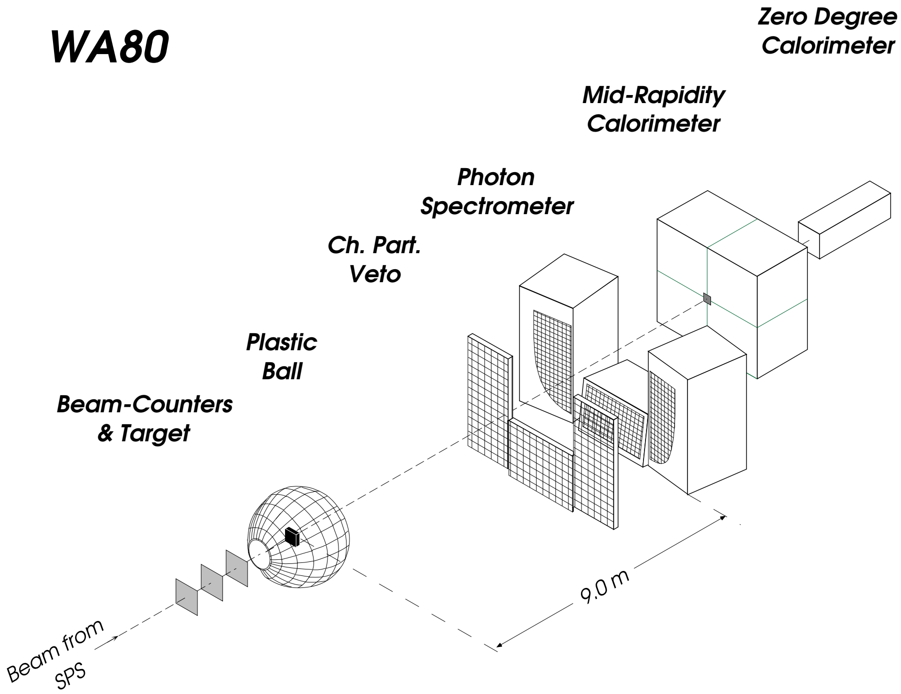

Figure 1: Perspective view of the WA80 experimental setup

Figure Details

Plastic Ball	Particle Identifying Spectrometer, p,d,t,He, P$-1.7 \leq \eta \leq 1.3$
Ch. Part. Veto	Streamer tube arrays, $1.5 \leq \eta \leq 4.4$ ($2.1 \leq \eta \leq 3.0$)
Photon Spectrometer	Lead Glass Arrays, $1.5 \leq \eta \leq 2.1$ ($2.1 \leq \eta \leq 3.0$)
Mid-Rap. Calo.	Sampling Pb-Fe Scint. Calo., $1.5 \leq \eta \leq 4.4$
Zero Degree Calo.	Sampling U-Scint. Calo., $\eta \geq 6.0$

Related Experiments

WA93, WA98