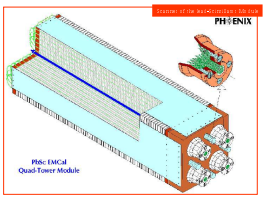
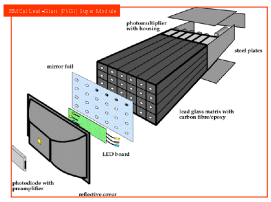
The Detection of Electromagnetic Probes of the Quark-Gluon Plasma (**QGP**)

The PHENIX ElectroMagnetic CALorimeter EMCAL



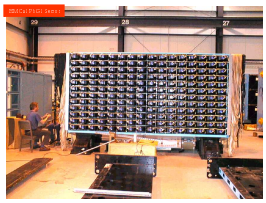
DESCRIPTION

The PHENIX Electromagnetic Calorimeter Subsystem consists of 2 detectors. Six PHENIX sectors (15,552 channels) are covered by a lead-scintillator calorimeter (PbSc) with longitudinal wavelength shifting fiber readout (left side), and two sectors (9,216 channels) are covered by a lead glass calorimeter (PbGl) used at CERN experiments WA80 and WA98 (right side).



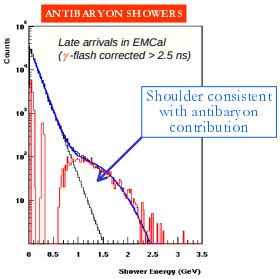
PHYSICS GOALS

- **Thermal radiation** from QGP (probe: γ , γ^*)
- **Jet quenching** (probes: high-p_t π^0 and γ -tagged jets)
- **J/Ψ suppression** (probe: $J/\Psi \rightarrow e^+e^-$ at $y=0$)
- **Disoriented chiral condensates** (probe: π^0/π^{+-})
- **Chiral symmetry restoration** (probe: $\phi \rightarrow e^+e^-$)
- **Global event characterization**: E_t , $dN/d\eta$ measurements

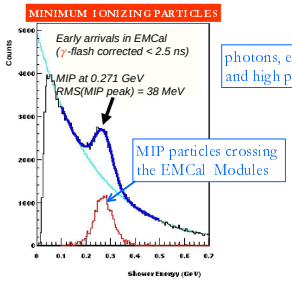


PARTICLE IDENTIFICATION

ANTIBARYON SHOWERS

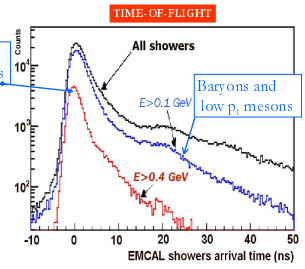


MINIMUM IONIZING PARTICLES



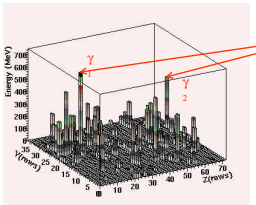
photons, electrons and high p_t mesons

TIME-OF-FLIGHT



Au+Au collisions ($s^{1/2}$ = 56, 130 GeV). First 50000 events

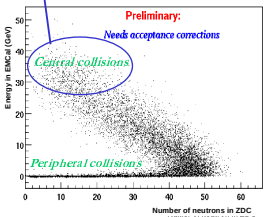
EVENT IN THE WEST-0 PBSC SECTOR ($E_{cone\,all}$=32 GeV)



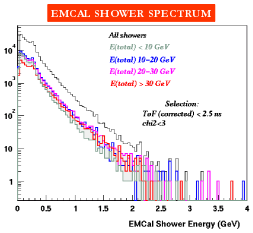
π^0, η $\quad m_{inv} = \sqrt{2E_{\gamma 1}E_{\gamma 2}(1-\cos\theta_{\gamma 1\gamma 2})}$

High Energy Density Events: Searching for QGP ....

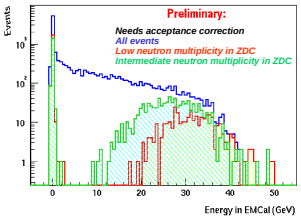
EVENT CHARACTERIZATION: EMCAL-ZDC CORRELATION



EMCAL SHOWER SPECTRUM



EVENT CHARACTERIZATION: GLOBAL OBSERVABLE: TRANSVERSE ENERGY



Y. Antomkin, L. Aphecetche, T. Awes, S. Bathe, H. Buesching, A. Bazilevsky, S. Belikov, D. Bucher, H. Buesching, I. Chernichenko, G. David, H. Delagrange, A.Denisov, D. d'Enterria, A. Durum, R. Glaoui, Y. Goto, M. Grosse Perdekamp, S. Fokin, M. Ippolitov, K. Karadjev, E. Kistenev, V. Kochetkov, V. Manko, G. Martinez, V. Melnikov, S. Nikolaev, A. Nyanin, V. Onuchin, T. Peitzmann, K. Reygers, R. Santo, V. Schutz, Ad.olchanov, P.Stankus, J.Stoll, M.Tannenbaum, H.Torii, A.Utrobichev, A. Vinogradov, M.Volkov, I. White , C. Woody, G.Young
for the PHENIX Collaboration

Brookhaven National Laboratory (USA),
Institute of High Energy Physics Protvino (Russia),
Kurchatov Institute, Moscow (Russia),
Oak-Ridge National Laboratory (USA),
University of Münster (Germany) and
SUBATECH, Nantes (France)