PHOBOS

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Physics Goals:	Study nuclear matter at extremes of energy and baryon density; search for the Quark-Gluon Plasma; study nature of confinement and the QCD vacuum.
Beams:	p + p, p + Au, and Au + Au at 100 GeV/A

Physics Summary

The aim of the PHOBOS research program is to obtain a better understanding of QCD, the nature of confinement and the QCD vacuum, through a study of matter at extreme energy density. In particular to search for possible evidence for a phase transition to a Quark-Gluon Plasma in heavy-ion collisions at RHIC energies. In searching for signs of new physics, the following will be studied with the PHOBOS detector:

1. Event-by-event pseudorapidity and azimuthal distributions of charged particles and photons over the full solid angle. (The primary aim here will be to identify events with abnormally large multiplicity or fluctuations.)

2. Particle ratios (π, K, p, ϕ, Λ) and Pt distributions near mid-rapidity. [π/K separated up to 550 MeV/c by dE/dx and up to 1150 MeV/c by time of flight.]

3. Particle correlations, in particular Bose-Einstein correlations.

4. Mass and width of $\phi \rightarrow K^+K^-$.

The particular strengths of PHOBOS are:

1. Coverage down to very low Pt's ($\sim$35 MeV/c).

2. Very high data rate and capability to analyze a very large number of events. This allows data to be taken in an unbiased way (no restrictive trigger).

3. Flexible design which allows reconfiguration of detector, should multiplicity of most interesting events be much higher than expected.

Selected Publications

"The PHOBOS Experiment at RHIC and AGS", B. Wyslouch, Proc. Quark Matter '93, Nucl. Phys. A566 **94** 305c.

"Low Pt Physics and Compact Detectors at RHIC and LHC", W. Busza, Proc. NATO Advanced Study List on Particle Production in Highly Excited Matter, Il Ciocco, (1992) 149.

"Conceptual Design Report", MIT Laboratory for Nuclear Science, (1994).

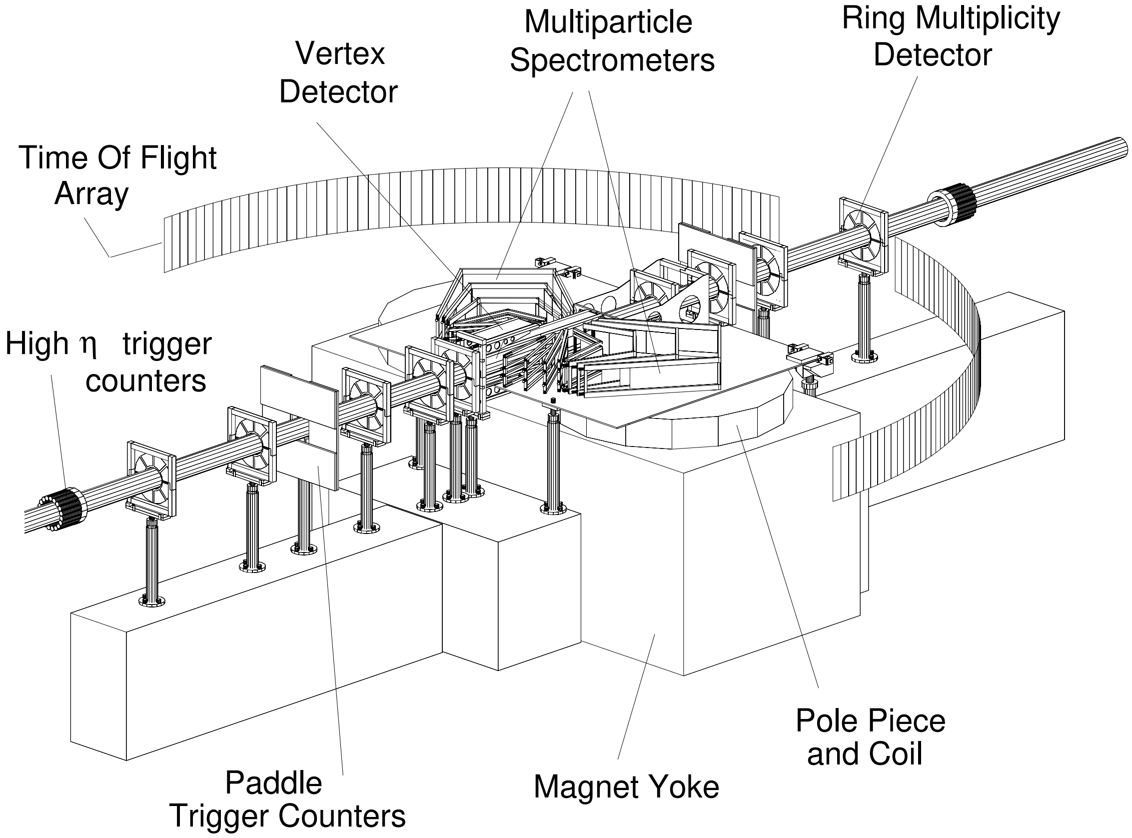

Figure 1: A Schematic of the PHOBOS Experiment (top magnet yoke removed)

Figure Details

The PHOBOS detector consists of two major components. The first is a double-arm multiparticle spectrometer used to measure identified particles at low Pt, over approximately one unit of rapidity at mid-rapidity. The second is an array of silicon detectors designed to measure the full azimuthal distribution of charged particles and photons over almost the entire rapidity range available at RHIC.