The BRAHMS Experiment at RHIC

M. Murray, K. Hagel, J. B. Natowitz, R. Wada, T. Keutgen and A. Makeev

The BRAHMS experiment at RHIC [1-3] first detected collisions on June 15, 2000. This marked the beginning of the BRAHMS physics program and analysis. The first collisions of all four RHIC experiments were at an energy $\sqrt{s} = 56$. The BRAHMS experiment collected a number of events, but the detectors were not completely tuned during that phase and the data collected at $\sqrt{s} = 56$ were of very limited use.

The entire mid-rapidity spectrometer (MRS) as well as the front part of the forward spectrometer (FFS) and all global detectors were instrumented during the 2000 run, but the back part of the forward spectrometer (BFS) was only partially instrumented. This allowed us to gate tracks in the FFS and MRS on collision centrality as well as to make an independent dN/dη measurement.

A few days after the first collisions were observed at $\sqrt{s} = 56$, the RHIC operations group began to tune the machine for $\sqrt{s} = 130$. It was mid-august by the time this was accomplished with a workable intensity. We used the interim period of time to tune and understand the detectors. At that point BRAHMS began the experimental program in earnest.

Date were taken at the angles and magnetic fields of the front part of the forward spectrometer (FFS) which are shown in table 1 and the angles and fields of the mid-rapidity spectrometer (MRS), which are shown in table 2.

Table 1. Angle and field settings of the FFS

FFS Angle	D1 Field	D2 Field
4	2.3	3.79
4	-2.3	-3.79
5	-1.91	-3.15
5	-2.3	-3.79
5	2.3	3.79
8	2.3	3.79
12	2.3	3.79

Table 2. Angle and field settings of the MRS.

MRS Angle	D5 Field
40	3.77
45	3.77
45	-3.77
60	3.77
60	-3.77
90	-3.14
90	3.77
90	-3.77

The variety of angles and field settings that were taken provided for a very good first look at the high energy data collisions.

The data analysis of the 2000 run is ongoing. A significant effort was spent in calibration of the detectors. The tracking detectors that were instrumented are now well understood and the tracks are reconstructed. The time of flight is also calibrated. The ratios of anti-protons to protons have been extracted at several pseudorapidities[5]. The collaboration has also extracted dN/dη over a wide range of pseudo-rapidity [6]. We at TAMU are in the

process of analyzing the data to extract the EM contribution [7] as well as beginning an analysis to systematically extract transverse momentum spectra for all identified particles as a function of centrality.

In summary, BRAHMS had a very fruitful first year of running and has extracted interesting physics. The second year of running with the full complement of detectors instrumented promises to be more exciting yet.

References

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