The BRAHMS Experiment at RHIC

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

The BRAHMS experiment at RHIC is nearly complete and is expected to acquire high quality data very soon after the first RHIC beam is delivered. Platforms as well as detectors have been surveyed and precise angle markers installed. The last major run of cables from the IR to the counting house has been completed.

The Beam-Beam counters and multiplicity tile detectors were tested with actual beam last summer when the first RHIC beams of 50Gev/u Au circulated in one direction and produced interactions of Au with gas. This provided a first opportunity to observe the performance of these detectors as well as to shake down the data acquisition and monitoring software.

The rest of the detectors have been installed since that test run. The TPC's have in a continual test mode to solve some sparking problems. This resulted in a rebuild of the pad-planes as well as some slight modifications in how the grid wires are fastened to the frames. The TPC readout has been incorporated into the DAQ and that readout along with the TPC monitoring software has been tested using cosmic muons.

In February there was a test run in which pulser signals were injected into all of the major detector components and the data was then acquired with the DAQ system in the same way as will be done in the real experiment.

BRAHMS also participated in another short Mock Data Challenge which had the primary purpose of testing the HPSS in the RCF. In this MDC we were able to make some useful measurements of HPSS parameters. The HPSS proved to be rock solid at the data transfer rate of 4Mb/s as it was designed for BRAHMS.

The BRAHMS effort at TAMU continues to be software development for BRAHMS data analysis. In the past year the focus has been on reading raw data and monitoring raw data. The raw data reading routine was implemented into the BRAHMS software infrastructure in the time leading up to the test beam last summer at RHIC. It included the capabilities for reading the detectors that were installed at that time as well as the infrastructure to easily add reading routines for the other detectors as they were installed and the data structures from the frontend became known.

The monitoring routine effort was started around the same time for the obvious purpose of monitoring a sampling of the data as it was acquired. The monitoring routines were designed with two goals in mind. The first goal is that the physicist writing monitoring software for the detector he built should be allowed to concentrate on software for his detector and not be bothered with intricacies concerned with complicated graphics routines. The second goal accounts for the fact that a particular person sitting on a data taking shift might not be an expert in the detector or even with the particular monitoring routine. The monitoring routines therefore of necessity should have a simple user interface. In the computer world today, that would imply a GUI with pushbuttons that are “simple”.

To achieve these goals, the monitoring routines were designed to consist of a base routine which handles all of the graphics as well as provides a Graphical User Interface (GUI) for easy display and manipulation of the spectra. The base routine also provides an interface to “plug in” specific monitoring routines for the various detectors. These routines manage the creation and incrementing of the various spectra, each of which is registered with the base routine. In this way the individuals working with their detectors can minimize the amount of time spent programming and understanding complex graphics routines and direct their efforts towards monitoring their detector. The GUI provides a convenient interface to connect into the BRAHMS event builder as well as to display monitoring spectra for particular detectors.

The routines described were tested in the RHIC test run last summer and were generally found to satisfy the monitoring needs for BRAHMS analysis. We have continued to develop these routines making them more robust and providing more functionality to be ready for the first RHIC data.