The BRAHMS Experiment at RHIC

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

The BRAHMS experiment at RHIC has made significant progress in the past year. Beam from RHIC is expected to be delivered for experimental use in November, 1999. It is currently planned that the forward spectrometer will be fully instrumented with its detectors, but the available power will limit the magnets to about half field thus restricting the coverage in phase-space. The Mid-Rapidity Spectrometer will have only half the time-of-flight wall instrumented, essentially restricting any given measurement to one sign of the charge. The spectrometers will be able to cover their full design angular range.

The current status of the various detector subsystems is that platforms, magnets and associated plumbing have been delivered. All of the detector components have been delivered or are in production. AC power is now available in the counting house and Front End Electronics Hit and all racks are mounted and NIM bins are installed. DAQ computers are also installed in the counting house with the final installation of network connections and switches currently underway.

The effort at Texas A & M continues to be a major contribution to the software needed for the analysis of BRAHMS data. In the past year we have moved from a prototype analysis system to a system more closely resembling the final version. Many of the software components have been refined to take into account the detectors as they are likely to be in analysis.

A major effort has been devoted to the Drift Chamber tracking code. This code was originally written in FORTRAN for a previous generation of Drift Chambers and was converted to C++ to be used in the ROOT environment. But the design of the BRAHMS drift chambers differs somewhat from the design of the detectors that the original code was written for. We have gone through the code and made appropriate modifications to take these changes into account. A major part of this has been accomplished, but work is still in progress.

We participated in two mock data challenges. The first occurred in September-October 1998. The goal of the MDC-I was described in last years report [1]. The full set of simulated geant events were read without crashing the program after some initial subtle problems with the tracking code were identified.

After the completion of MDC-I, modifications were made to the software based on what had been learned in MDC-I as well as what had been planned for the next refinements of the code. General track matching classes as well as general track matching routines were written. We also began to write some database managers to make the code more automatic in reading parameters for different runs. Event displays were written for the TPC's and Drift

Chambers. These displays have proven very useful in debugging tracking code.

In addition to refining the tracking code, the detector simulation code was also modified to contain the latest information about the various BRAHMS detector subsystems. The geometry for T1, T2 and TPC2 was finalized. We also implemented the final geometry for the two TOF walls, H1 and H2, complete with supporting frames and PMTS.

When the beam first turns on in November 1999 it will be the first time the full complement of detectors will be in place and see beam. Therefore a significant amount of time will be spent in the first part of the run commissioning the detectors and understanding backgrounds. Our current estimate is 8-10 wks. This time will be spent commissioning the full detector system, in particular the detectors on the BFS i.e. Drift Chambers, the H2 hodoscope and the RICH. In addition, before physics measurements can be performed it is necessary to understand the operation of the detector system under stable beam conditions and to study and evaluate in particular the Beam collisions, beam gas background collisions Detector backgrounds at different spectrometer settings. Trigger (Beam-Beam counters and Multiplicity array) and DAQ.

The First year physics goals include global multiplicity distributions and correlations with forward energy, a first survey of charged hadron rapidity distributions from Au on Au collisions at selected transverse momenta, a set of higher statistics runs to obtain more complete p_t-spectra extending to higher p_t.

References

[1.] K. Hagel *et. al., Progress in Research*, 1997-1998, p II-41.