

Chapter 5

Integration of Muon Arms Into PHENIX

5.1 Physics Program

5.1.1 Interface to Other Subsystems

The nosecones on the central magnet have been developed out of performance simulations of the muon spectrometers. These studies have shown a significant improvement of signal to noise for Au-Au running as they enhance the ability to measure changes in vector meson rates. Their present design has been reviewed by the Muon and MVD subsystem groups and PHENIX management.

5.1.2 Magnets

The North Muon steel installed in the PHENIX Experimental Hall and Muon Identifier panels have begun to be installed. The collaboration has already specified the installation requirements and the services needed to operate these magnets. A magnet mapping program is underway. This program will compare the measured field with the field derived from simulation program, and will become part of the database used during data analysis and further simulation studies. A general grid of 5-10 cm will be adequate for most of the magnetic volume. A more careful measurement of the field over those regions where there will be high gradients, such as the area close to the surface of the piston, and where the symmetry of the magnetic volume may be broken by mechanical supports, will be made. Measurements on a grid of 1-2 cm spacing will be required. Because of the interaction of the magnetic fields between the Central Magnet and the two Muon Magnets, the mapping of all three magnets will take place at the same time.

5.1.3 Ancillary Systems

The installation of the PHENIX muon arms must be coordinated by the PHENIX integration group for schedule, safety, and manpower. Safety and access issues must be developed

and implemented before installation of detector hardware. These issues are not only reviewed within the collaboration, but also in conjunction with the RHIC facility safety committee. Services for magnets and detector systems must be documented and reviewed before installation. Space around detector subsystems is at a premium and therefore must be planned with care. This means routing services for detectors must have clearly defined paths as the interface regions between different detector subsystems are very tight.

A major planning issue is the alignment and survey of the global detector. The alignment and survey crew at the AGS accelerator facility has attached monuments to the walls in the hall as well as on the detector subsystems. Lines of sight through the detector are difficult to achieve, thus both muon arms will have “active” alignment monitoring systems to track the variation in position of the tracking stations in relationship to each other, as well as the PHENIX detector global location.