

INTRODUCTION

The objectives of the RHIC Project are to plan, design, construct and operate a Relativistic Heavy Ion Collider facility at the Brookhaven National Laboratory that will enable studies of nuclear phenomena in heavy-ion collisions.

The collider will be constructed in an existing 3.834 km long ring tunnel. The major performance requirements for the collider are a beam energy ranging up to 100 GeV/nucleon for the heaviest ions, e.g. for Au-Au, and a luminosity at top energy of about $2 \times 10^{26} \text{ cm}^{-2} \text{ sec}^{-1}$ at each of the possible six crossing points with a beam lifetime of approximately 10 hours.

This Design Manual defines the expected collider performance and, at the same time, the appropriate accelerator physics and engineering parameters necessary to build the machine. The Design Manual defines the design requirements of each accelerator system, as well as the major system components. As such, its purpose is to bridge the transition from the conceptual design to the engineering and fabrication of the accelerator. It also gives the locations of all major ring components, notably the location of magnets, rf cavities, beam position monitors, and injection and beam dump equipment.

The Design Manual is one of the RHIC Project technical baseline documents. The Design Manual, together with Design Drawings and Specifications, establishes the approved configuration of the RHIC facility. Changes to the Design Manual require a formal procedure in accordance with the RHIC Configuration Management Plan, i.e. a review by the Configuration Control Board and approval by the RHIC Project Head or, if certain thresholds are exceeded, by DOE.

The Design Manual itself is structured as a ring binder to allow changes resulting from the ongoing design process. After review, the authorized changes will be processed by the Configuration Control Office and the revised pages will be issued to all holders of numbered manuals for incorporation into the manual.

In order to prevent confusion caused by outdated information, each page of the Design Manual will be coded as to its Accelerator System, the page number within an Accelerator System, and the revision date. The Table of Contents indicates the valid revision of the Design Manual.