

**PHYSICS DIVISION**  
**FY 2006**  
**PERFORMANCE ASSESSMENT PLAN**

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**PHYSICS DIVISION**

## FY 2006 Performance Assessment Plan

### I. Mission Statement

The mission of the Physics Division is to perform fundamental experimental and theoretical research in the fields of atomic and nuclear physics, to operate user facilities in support of these national programs, and to provide the supporting capabilities for this research in a cost-effective, safe, and environmentally sound manner.

### II. Major Initiatives

- Facility Upgrade Plans
  - Holifield Radioactive Ion Beam Facility (HRIBF)
    - Second RIB ion source (IRIS2)— FY06 start installation
    - Second RIB production accelerator to supplement ORIC
  - Multicharged Ion Research Facility (MIRF) upgrade
    - FY06 initial High Voltage experiments
    - Completion of floating beamline construction
    - Progress on atomic and molecular ion diagnostic apparatus
- Rare Isotope Accelerator (RIA)
  - Support DOE Long Range Plan to achieve recommendation for funding
  - Work to ensure Division participation in design, R&D work, formation of experimental collaborations, and detector construction
  - Identify opportunities for other divisions to participate in RIA, for example in target ion-sources, remote handling, and fragmentation target areas
- Fundamental Neutron Physics
  - Support NSAC Long Range Plan by constructing Fundamental Neutron Physics Beamline (FNPB) at the SNS. FNPB is scheduled to complete installation of “Phase 1” components by the end of Q2FY06 in order to decouple our project schedule from SNS operations.
  - Establish nuclear physics research program with cold neutrons
- High Energy Nuclear Physics

- Work to ensure Division participation in PHENIX upgrade project and LHC ALICE project
- Neutrino Physics
  - Develop proposal for SNS-based experiment to measure neutrino-nucleus cross-sections key to nuclear structure theory and astrophysics models (at SNS)
  - Participate in development of proposal to search for neutrinoless double-beta-decay of  $^{76}\text{Ge}$  (MAJORANA)
- Gamma-Ray Imaging
  - Develop gamma-ray imaging techniques which may be applicable to nuclear physics research, gamma-ray astronomy, medical imaging and national security
- Computational Physics
  - Develop new proposal for Supernova Science
  - Develop proposal for Reaction Theory
  - Develop proposal for plasma edge simulations

### **III. Business Summary and Strategic Plan**

The Division supports a range of DOE programs in nuclear and atomic physics basic research. These programs are defined and evolve through regular interaction with program sponsors and scientific collaborators and users. The programs include:

- Operation of the Holifield Radioactive Ion Beam Facility as a national user facility for low energy nuclear physics
- Operation of the Oak Ridge Electron Linear Accelerator and of the Multicharged Ion Research Facility to support neutron physics and atomic physics research, respectively
- Performance of low-energy and high-energy nuclear physics research, both theory and experiment
- Performance of theoretical and experimental basic research in atomic physics
- Operation of a Data Center for atomic physics relevant to fusion energy and plasma science and a data project for nuclear physics

The Division interacts frequently with program officers in the KB, KC, KJ, and AT programs to support its research. It takes guidance from Long Range Plans prepared by NSAC, BESAC and FESAC and participates actively in development of those plans where possible. Staff serve on these groups and their subcommittees in order to determine future research directions.

Current facility enhancement efforts include upgrades to HRIBF, to the Multicharged Ion Research Facility (MIRF) for atomic physics and to the research effort at PHENIX at RHIC. New capability for fundamental neutron research at SNS is also under development. New research programs are also under development for: a) low-energy nuclear research at RIA; b) ultrafast, ultraintense-laser research to develop intense, pulsed, laboratory-scale sources of x-rays and radioactive ions; c) a storage ring for highly charged atomic and molecular species; and d) high-energy nuclear physics research at the LHC at CERN. Experiments for the measurement of neutrino-nucleus cross-sections, the neutrinoless double-beta-decay rate in  $^{76}\text{Ge}$ , and gamma-ray imaging techniques are under development. A program in response to the expected new joint effort among DOE, NASA and the NSF, promulgated by the Committee on the Physics of the Universe, is in initial stages of development.

The Division forms and maintains the national and international collaborations to support its research efforts. The Division hosts a Users Group to utilize HRIBF and promote its science at NSAC and with the DOE Office of Nuclear Physics. The Division runs an active visitor program to sponsor undergraduate, graduate, and postdoctoral researchers as well as host-established researchers and faculty, and hosts and operates schools and workshops regularly.

#### **IV. FY 2006 Performance Goals – Division Director**

- Maintain performance, excellence of science program
- Continue as the lead U.S. laboratory for low-energy nuclear physics research with radioactive beams, including theory and experiment
- Collaborate to establish a relativistic heavy-ion program at CERN
- Complete the SNS FNPB and become the US center for nuclear physics research with cold neutrons
- Build on the successful SCIDAC program in physics of core collapse supernovae and add new SCIDAC programs in plasma-edge physics and nuclear reaction physics
- Continue as lead laboratory for experimental and theoretical physics and chemical science that is fundamental to plasma science
- Continue to develop synergies for research in fundamental chemical sciences relating to plasma science and in particular opportunities arising from ITER
- Operate ORELA for low-energy neutron cross section measurements and develop program for DP and other sponsors
- Develop program in neutrino physics with one focus on double-beta-decay

- Continue studies of fission-product yields from fast lasers via ORNL LDRD
- Complete two hours per month management observations
- Provide a work environment that protects workers and the environment
- Provide efficient and effective implementation of integrated safety, health, and environmental management
- Provide efficient, effective and responsive financial management
- Demonstrate effective transfer of technology and commercialization of intellectual assets
- Secure continued funding for ORELA operations
- Pursue increased funding in both nuclear and atomic physics programs
- Execute workforce plan as defined in the Directorate Business Plan and assure sufficient staffing to support the Physics Division mission
- Continue participation in educational outreach programs

#### **V. FY 2006 Performance Goals – Group Leaders**

- Conduct two hours per month management observations
- Provide a work environment that protects workers and the environment
- Provide efficient and effective implementation of integrated safety, health, and environmental management
- Provide efficient, effective and responsive financial management
- Develop new program directions for science
- Assure quality of publications and invited talks
- Review customer feedback and resolve issues
- Promote recognition of staff accomplishments
- Recruit and maintain high quality Division staff
- Optimize equipment to increase experimental capabilities at user facilities
- Expand portfolio of isotopically separated unstable beams
- Provide 1050 (subject to change based on president's budget) hours of radioactive beam on target to maintain HRIBF as a national user facility
- Continue to improve HRIBF operational availability, with goals of >50% availability and >85% predictability
- Provide required HRIBF performance metrics to DOE HQ

#### **VI. FY 2006 ESH Performance Goals – Research Support Group Leader**

- Ensure effective implementation of Issues Management Program
- Strive to improve safety performance
- Conduct two hours per month management observations
- Provide a work environment that protects workers and the environment
- Provide efficient and effective implementation of integrated safety, health, and environmental management

- Provide efficient and effective waste management, minimization, and pollution prevention
- Demonstrate a successful self-assessment program through review of line management feedback and improvement programs
- Promote improvement in energy efficiency
- Promote improvement in management of legacy materials, waste, and facilities
- Investigate all injuries
- Assure staff awareness of safeguards and security
- Implement Document Control Program and assure Division procedures, guidelines, and aids to operations are reviewed, approved, and updated in accordance with Program requirements
- Assure procurement controls for items and services meet the user's need and comply with applicable ESH&Q requirements
- Assure Division staff, users, and guests receive appropriate training to perform their jobs safely, effectively, and efficiently
- Assure that four safety presentations are conducted annually
- Review all procurements for hazardous materials to identify opportunities for minimizing quantities of hazardous materials purchased. The Chemical Management Center inventories will be monitored for materials that can be used in Division operations. Hazardous material inventories will be evaluated and useable, but unwanted, materials will be offered to the Chemical Management Center.
- Promote internal recognition of staff accomplishments

## **VII. Risks to Success in FY 2006**

- Cost overruns on HRIBF Upgrades project – Beene, Tatum
  - Monthly reviews of the HRIBF Upgrade project will be conducted with the Division Director and DOE HQ.
- Cost overruns on FNPB Construction project — Greene, Cianciolo
  - Monthly reviews of the FNPB project will be conducted with the Division Director and DOE HQ.
- Inadequate funding to reach goals of the MIRF upgrade – Schultz
  - Continued increased attention to project management by the Group Leader and the MIRF task leader, frequently experimental atomic physics group meetings and day to day communications, and monthly reviews of the new beamlines for the MIRF upgrade project with the Division Director will be conducted.
- Insufficient staff to operate ORELA – Young & Beene
  - Pursue staffing opportunities for ORELA operations.

- Unexpected failure of HRIBF systems – Beene, Tatum
  - Regular maintenance and inspection of all HRIBF systems and components is standard practice and will be strictly followed.
- Loss of key staff – Young & Group Leaders
  - To the extent practical, backup training for critical roles will be conducted.
- Loss of HRIBF to funding crisis – Young, Beene, Tatum
  - This is not very likely following the results of the DOE review.
  - Will continue to improve HRIBF capability and scientific productivity.
- ESH&Q risks to success - Kennedy
  - Electrical safety (shocks, exposed energized)
  - Radiological safety (unplanned events, unknown work conditions)
  - Slips, trips, falls; elevated work; lifting activities
- Loss of ability to do our own radioactive waste characterization – Beene, Kennedy
  - Maintain trained personnel and approved documentation for rad waste characterization.
  - Update library on new gamma spectroscopy counting system and put in service to reduce backlog of radioactive waste.

**PHYSICS DIVISION  
PERFORMANCE ASSESSMENT SCHEDULE  
FY 2006**

**1. OVERVIEW**

The Physics Division FY 2006 Performance Assessment Schedule includes four quarterly walk-through inspections, which will cover all Division facilities each quarter and will assess the effectiveness of Integrated Safety Management (ISM) in Division operations. Performance assessments will address occupational safety, Price-Anderson Amendments Act (P-AAA) compliance, environmental protection, industrial hygiene, radiation protection, quality assurance, emergency preparedness, training, procurement, and operations. Additional assessments or surveillances will be conducted with assistance from the Division Quality Assurance Coordinator and other subject matter experts, as appropriate. Group Leaders will participate in quarterly performance assessments. Division (Building) Operations Managers and Lab Space Managers will conduct periodic walk-through inspections of their respective areas. The Assessment & Commitment Tracking System (ACTS) will be used to document deficiencies and track corrective actions. The Division Operations Manager is responsible for the Performance Assessment Program.

An assessment of management and organization will be conducted annually by the Division Line Management. Training Requirements Review forms will be reviewed annually by Group Leaders during the performance appraisal discussions with employees.

Lab Spaces certifications will be reviewed annually. End-station reviews will be conducted at least every two years and after major modifications.

## **II. QUARTERLY ASSESSMENT SCHEDULE**

### **First Quarter FY 2006 Focus Areas**

Waste management, P-AAA compliance, radiation protection, quality assurance, procurement

### **Second Quarter FY 2006 Focus Areas**

ISM implementation & procedures, laser safety, training, operations, lab space certifications

### **Third Quarter FY 2006 Focus Areas**

Occupational safety, electrical safety, emergency preparedness

### **Fourth Quarter FY 2006 Focus Areas**

Hazard communication, environmental protection, industrial hygiene

## **III. PERFORMANCE INDICATORS**

- DOE HQ NP initiated peer review for HRIBF
- DOE HQ BES and FES initiated peer review for MIRF
- DOE HQ DP initiated peer review for ORELA
- Significant awards

- Number and impact of publications
- Efficient and effective delivery of program goals within allocated funding (includes operating, capital, AIP, and MIE budget levels)
- RIB hours on target
- HRIBF availability and predictability
- Number of different beam species under development and/or newly available
- Types and numbers of assessments, hours invested, effectiveness of actions
- Open/closed actions, types of actions
- Personnel provided behavior based training
- Hours per month management observations
- DART, TRC
- Unplanned rad dose
- Reportable releases to environment or permit violations
- PAAA enforcement actions
- Cat 1 or 2 occurrences
- Average dose <100 mrem
- RERs and events related to contamination control
- Identification of primary ESH risks and precursors
  - Electrical shocks, near misses, exposed energized equipment
  - Unplanned rad events, near misses, unknown rad conditions
  - Slips, trips, falls; elevated work concerns; lifting concerns
- Waste non-compliances
- Waste minimization efforts
- Technology transfer commitments, invention disclosures, patents, licenses, funding for technology transfer, SBIR/STTR
- Major investments in infrastructure repairs or improvements
- Legacy material initiative funding used, waste processed