

# **DAE-DOE Discovery Science Collaboration Governance Plan for the Indian Institutions Fermilab Collaboration under Project Annex I and II**

## **Introduction**

In July 2011, the United States' Department of Energy (DOE) and India's Department of Atomic Energy (DAE) signed an Implementing Agreement (IA) on Discovery Science [1] that provides the framework for collaboration between DOE and DAE laboratories (in particular Fermilab, BARC and RRCAT) in the next-generation particle accelerator facilities, related physics and applied science experiments. Under the terms of the IA, the agencies have also developed Project Annexes for scientific collaboration on specific projects of DAE and DOE [2].

The Indian Institutions and Fermilab Collaboration (IIFC) was established in February 2009 for the purpose of fostering collaboration and coordination in the Fermilab High Intensity Superconducting Proton Accelerator (HISPA, aka PIP-II), the Indian Spallation Neutron Source (ISNS) and the Indian Material and Energy Science Accelerator (IMESA). In Nov 2009, the IIFC expanded the accelerator collaboration to include Indian universities and have initiated participation in Fermilab neutrino physics and related experiments; MINOS, NOvA, LBNE and MIPP.

The IIFC has a working management structure [3] which includes both the accelerator and physics collaboration between Fermilab and Indian Institutions. This document describes the management structure that is outlined in the Implementing Agreement and Project Annexes I and II between DAE and DOE. The IIFC management structure supports the DOE-DAE IA.

The DAE-DOE, the collaborating laboratories, and the projects' organizational structure (Figure 1) are based on an integrated scientific and engineering team comprised of staff from both Fermilab and the Indian Institutions, whose work is carried out under the Project Annexes

## **The Projects**

Each Project Annex identifies a number of specific joint DAE-DOE activities (projects) that it covers:

Project Annex I focuses on the joint development by DOE and DAE of three accelerators in the United States and India.

1. The construction, proposed by Fermilab, of a Superconducting Radio Frequency linac as a part of HISPA to support the High Intensity Physics mission of the US-DOE (also known as PIP-II)

2. DAE laboratories (RRCAT and BARC) in collaboration with other DAE laboratories and Fermilab have proposed
  - a. The Indian Spallation Neutron Source (ISNS) at RRCAT (Indore)
  - b. The Indian Material and Energy Science Accelerator (IMESA) at BARC (Vizak)

Fermilab will coordinate the development of HISPA for the DOE with national and international collaborators including DAE laboratories. Similarly BARC and RRCAT will coordinate the development of their respective accelerators within DAE and with Fermilab.

Project Annex II focuses on the joint development of a physics program of common interest to the Indian Institutions and Fermilab. The flagship project of the physics program is the Intensity Frontier Neutrino Experiment (IFNE).

All joint Fermilab-DAE/DST aimed at HISPA will be coordinated by the Fermilab HISPA (PIP-II) Project Management Office, Fermilab. Joint activities within the IFNE project, due to its magnitude, will be coordinated by Fermilab IFNE Project Management and IFNE-India Project Management. Figure 1 shows the proposed management structure to provide coordination of DOE and DAE activities covered in the two initially prepared Annexes (I and II) to the IA. The blue and orange boxes Figure 1 correspond to the activities identified in Project Annexes that the two sides initially plans to undertake respectively. Within both the blue (Accelerator: Project Annex I) and orange (IFNE: Project Annex II) boxes there is a set of corresponding U.S. and Indian programs.

## **Principal and Technical Coordinators**

The IA outlines the high level management structure for managing the work done by the collaborating institutions. The DOE and DAE with mutual understanding and agreement will each appoint one Principal Coordinator and Technical Coordinator(s) to oversee all cooperative activities under the IA (Project Annex I and II, and any subsequent Annex developed with Fermilab). The Technical Coordinator is responsible for the high level management and coordination of project activities described in Project Annex I and II. Figure 1 shows the high level management structure that IIFC will operate under.

The IA and its Project Annexes I and II define the Roles, Responsibilities, Authorities and Accountabilities (R2A2) of the Principal and Technical Coordinators. In case of differences between the descriptions here and those in the IA and PAs, the latter take precedence.

These R2A2 are reproduced here for completeness:

- The Principal Coordinators shall jointly plan and coordinate cooperative activities, co-chair joint meetings, and prepare an annual Program of Cooperation. Each Principal Coordinator may appoint a Technical Coordinator for each cooperative activity.

- The Principal Coordinators shall meet on an annual basis, or otherwise as mutually agreed, alternately in the United States and in India, in other locations as mutually agreed, or by teleconference. At these meetings, the Principal Coordinators shall review and assess the progress of activities and the next year's plans for continuation of cooperation under this Agreement.
- The Principal Coordinators shall jointly prepare a written report of each meeting. Each Party has the right to disseminate the written meeting report after the report consultation with major stakeholders has been approved for release by both Parties
- The Technical Coordinators shall jointly plan the technical approach for accomplishing the objective of the Project Annexes, and shall be responsible for the collaborative program, schedule, and coordination.
- The Technical Coordinator shall give progress reports at Principal Coordinator meetings.

**Indian Institutions and Fermilab Collaboration**  
**The DAE-DOE Implementing Agreement on Discovery Science:**  
**Project Annex I and II Management and Coordination**  
**Fermilab: HISPA, IFNE**  
**Indian DAE (BARC, RRCAT): Accelerator Programs**  
**Indian DAE/DST: Physics Collaboration**

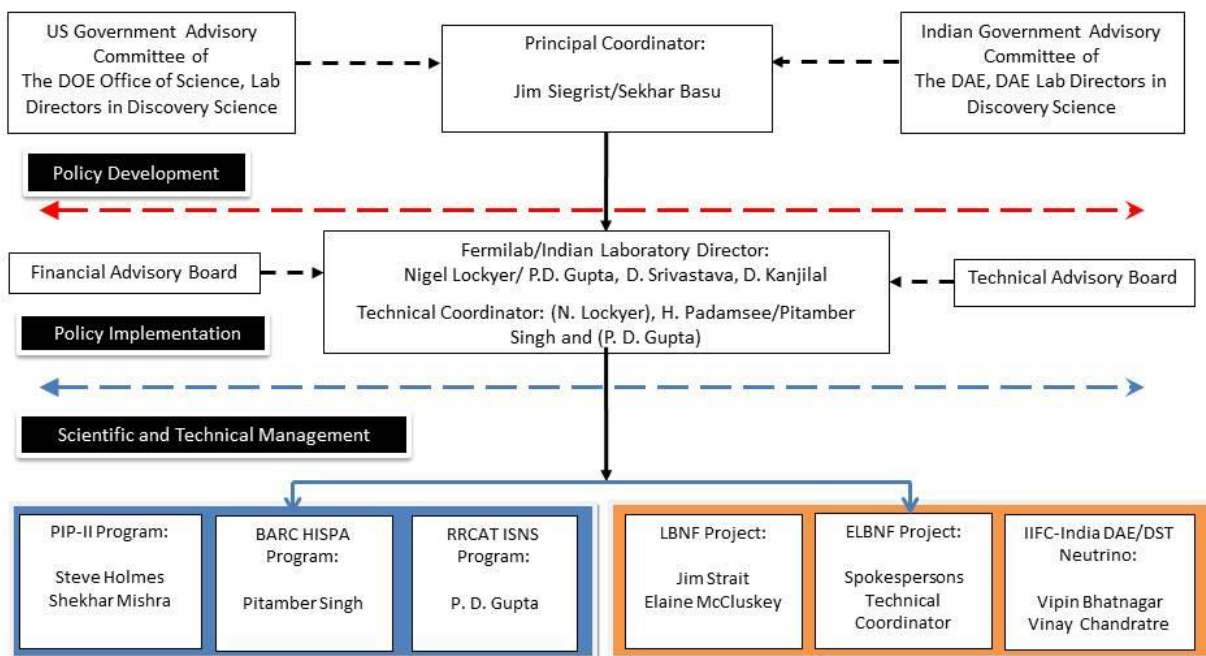


Fig. 1 Project Annex I and II Management and Coordination

- The Technical Coordinator shall exercise due care of budget, schedule, safety and other applicable requirements in carrying out all the work under the Project Annexes.

- The Technical Coordinator is responsible for the development, management and coordination of project activities that will be described in Project Annexes.
- The Technical Coordinator will assist the Principal Coordinator in all matters outlined in the IA and Project Annexes. This could include assistance on:
  - Scientific and Technical oversight of the Discovery Science Collaboration Projects in line with DOE's mission and policies.
  - Represent the Principal Coordinator in meetings, where he/she cannot be physically present.
  - Prepare documents needed for the government agencies, including the Detailed Project Report, deliverables, budget etc.
  - Arrange for the DAE-DOE annual meeting under the IA. Assist the Principal Coordinator in preparing a written report of each meeting.
  - Assist the Principal Coordinator in review and assessment of the activities in preparation of the next year's plans for continuation of cooperation under the IA.

### **Advisory Committees to the Principal and Technical Coordinators**

In consultation with the DAE and DOE managements the Principal Coordinators will appoint an independent Advisory Committee to provide advice on the respective government's policies. It is envisioned that such a committee would have people from agencies, collaborating laboratories, US State, Indian Minister of External Affairs, Commerce and science officers in respective embassies. Together the two national Advisory Committees will form a joint Policy Advisory Committee.

The Policy Advisory Committee made up of the US and Indian governments representatives would look at the policy matters and recommend approval of purchases/fabrication contract above Rs 300 cr (US \$54M) to the Principal Coordinators. The Finance and Technical Sub-Committees, which will look at financial and technical matters respectively, would advise the Technical Coordinators and recommend approval of purchases/fabrication contracts between Rs 275 cr (US \$50M) to Rs 27.5 cr (US \$5M). Project Management Team of HISPA and INNE would have one member each on these committees. Technical coordinator with the recommendation of the Project Manager/Director and the concurrence of the DAE Principal Coordinator would approve the purchase/fabrication contacts below Rs 27.5 cr (US \$5M). These funding approval authorities described here is only for the work to be undertaken by the collaboration under the Project Annex I and II and funded by DAE. This will have no impact on the approval and spending authorities of the Project Management Office of individual projects at Fermilab, BARC and RRCAT that are funded from other sources.

### **Directors of the Collaborating Laboratories**

The Director of Fermilab and the Directors of the collaborating DAE laboratories and Vice Chancellors of the collaborating institutions will provide the scientific management for the work

to be done under this collaboration. They have the ultimate financial, technical, schedule and legal responsibilities of the work under the two Project Annexes.

They will appoint financial and scientific technical subcommittees to advise them and help review the progress. The Director will be assisted by the Technical Coordinator and Project Management Offices in these responsibilities.

### **Scientific Management and Coordination**

The scientific management and the day-to-day coordination of work under this collaboration would be carried by the respective Project Management Office. The HISPA, at Fermilab (aka PIP-II), IMESA, at BARC and ISNS, at RRCAT Project Management office will jointly develop and manage the accelerator development under Project Annex I. The technical work under Project Annex II will be jointly developed and managed by the Intensity Frontier Neutrino Experiment (IFNE) (aka EBLNF and LBNF), Fermilab, Program Management Office and IFNE-India Program Director.

The HISPA and IFNE Project Management in consultation with major stakeholders and the Technical Coordinators will appoint Level 2 managers for each sub-project. The Project Management Office would assist the Technical Coordinator in the overall high-level coordination of the program under these agreements.

The details of the Indian Institutions and Fermilab Collaboration project scientific management and technical management are described in detail in [3].

### ***References***

[1] <http://www.state.gov/documents/organization/177176.pdf>

[2] In Progress between DAE and DOE

[3] IIFC Management Plan <http://iifc.fnal.gov/MOU.html>