

# PIP-II

## Project Director Report



September 2022



### PROJECT HIGHLIGHTS

- Fermilab, PIP-II leaders visit partners in India
- HB650 cryomodule dummy load on transportation test to UK
- LB650 cavity and LLRF testing
- Tiffany Price presents at sustainability workshop

### UPCOMING EVENTS

November TBA | P2PEB#13

## Fermilab, PIP-II leaders visit partners in India

In early September, a cohort of Fermilab and PIP-II leaders spent three days in India. Lia Merminga, lab director; Hema Ramamoorthi, chief of staff & special assistant for international engagements; Rich Stanek, PIP-II project director; Allan Rowe, PIP-II in-kind contribution tech integration manager; and Ron Ray, LBNF/DUNE deputy director visited our collaborators at Bhabha Atomic Research Centre, BARC, and Raja Ramanna Centre for Advanced Technology, RRCAT, both units of the Department of Atomic Energy. It was Merminga's first international trip since becoming lab director.

At BARC, Merminga presented about Fermilab, BARC Director Ajit Kumar Mohanty talked

about their facilities, and PIP-II management and sub-project coordinators from BARC and RRCAT gave updates on the low-level RF, solid state RF amplifiers, and cavity and RF coupler development. The visitors also toured LEHIPA, the Low Energy High Intensity Proton Accelerator, and received an overview of the BARC program related to high-energy and nuclear physics.

At RRCAT, Ray provided an overview of LBNF/DUNE to generate interest in the project with DAE. Shankar V. Nakhe, RRCAT director, gave an overview of their program and discussed initiatives they want to grow; there was also a roundtable discussion with sub-project coordinators from RRCAT to review the status of work and the long-term visitor program with Fermilab.



By the end of the visit, a strategy was developed to close out the IIFC R&D phase and start the construction phase. The Fermilab cohort was happy to finally meet in person and look forward to future visits. The next step is to finalize plans for the construction phase with DAE contributions.

*Credit: RRCAT*

## HB650 cryomodule dummy load on transportation test to United Kingdom

A mass of concrete blocks configured to mimic the HB650 cryomodule, known as a dummy load, was loaded into the transportation frame for a transportation test to the United Kingdom. On Sept. 26, the dummy load was flown from Chicago to Luxembourg; from Luxembourg, it was driven to Daresbury Lab in Warrington, UK, home of our

collaborators at UKRI-STFC. A small number of Fermilab PIP-II staff have accompanied the frame on its journey. The dummy load is expected to arrive back at Fermilab on Oct. 10. So far, the trip achieved all major objectives and puts us on the right path for the prototype module shipment next year.



Above: HB650 dummy load reaches Daresbury Lab. Below: Group of UKRI-STFC collaborators and Fermilab PIP-II team members standing with the transport frame. Credit: Mitchell Kane



## LB650 cavity and LLRF testing

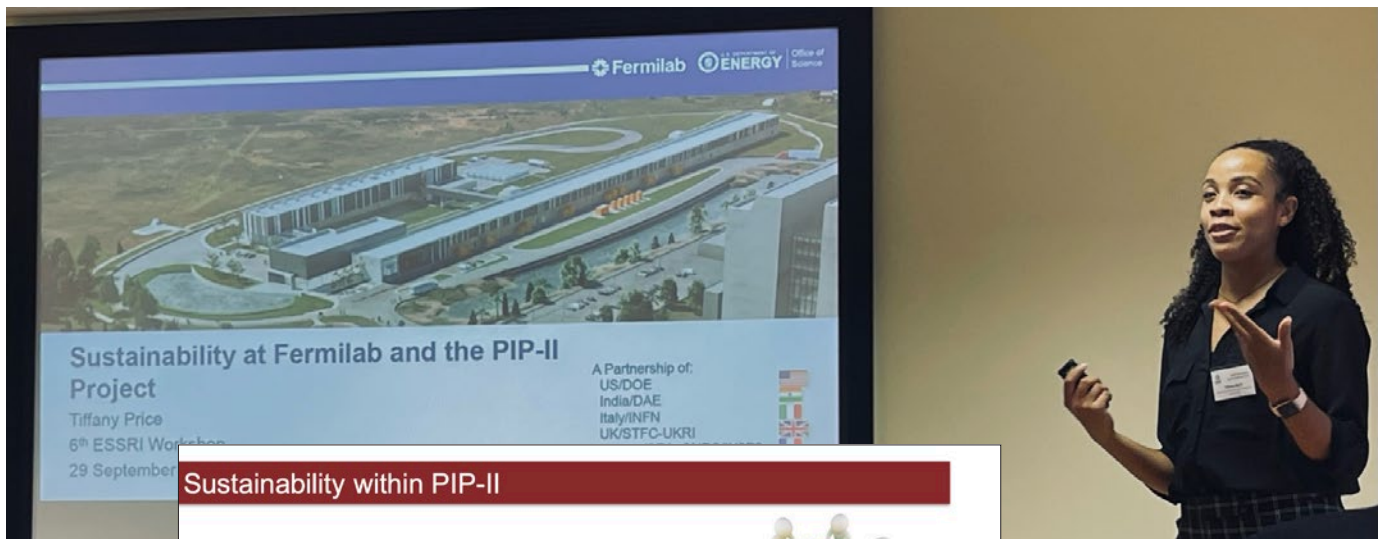
LLRF studies on a single low beta 650 MHz (LB650) elliptical cavity concluded on Sept. 30. During the final week, many important issues related to the field and phase control of the cavity were tested and verified. Previously, we had captured the appearance of the two pass band modes being excited and wanted to check if we could suppress them with notch filters in the feedback loop; the results showed that we can indeed suppress those modes, which allowed the resonance feedback gains to be increased significantly and improved both field and phase regulation. We were able to drive the cavity with full feedback

and regulation, what's known as Generator Drive Resonator (GDR) mode at the maximum gradient of 17 MV/m with regulation approaching the project requirements. With better microphonics suppression, performance will improve further. This accomplishment, which required close coordination among several disparate PIP-II groups as well as collaborators at SLAC and Lawrence Berkely National Lab, is a significant step forward in validating the performance of both the LB cavities themselves and the low-level system that provides the drive signal.

## Tiffany Price presents at sustainability workshop

The [Energy for Sustainable Science at Research Infrastructures workshop](#) took place Sept. 29–30 in Grenoble, France. Hosted by the European Synchrotron Radiation Facility, ESRF, in collaboration with five other European research institutes and laboratories, the workshop's purpose was to bring together international experts in the field of sustainability to share and identify ideas, challenges and best practices for implementing sustainable solutions at research infrastructures. Tiffany Price, mechanical engineer, attended the workshop and gave a presentation about Fermilab

and PIP-II's current sustainability initiatives, including a discussion of the driving factors for sustainability at Fermilab — and, by extension, PIP-II. The bulk of her talk was about the [PIP-II Sustainability Workshop](#) that was held in December of last year, focusing on the different opportunities that were identified during the workshop to explore further. Price also briefly discussed Fermilab's Site Sustainability Plan and how the Sustainability Management Team uses it to track progress in the 12 sustainability goal areas of the lab.



Credit: Mark Jeffers

**Sustainability within PIP-II**

**PIP-II Approach**

- Identify any improvements in the design phase to minimize retrofits post-construction
- Workshop held prior to construction to include:
  - PIP-II colleagues and partners
  - International sustainability experts
  - Representatives from future research infrastructure projects



10 09/29/2022 Price | Sustainability at Fermilab and the PIP-II Project | 6th ESSRI Workshop

