EIC@BNL Group Meeting

May 9, 2024

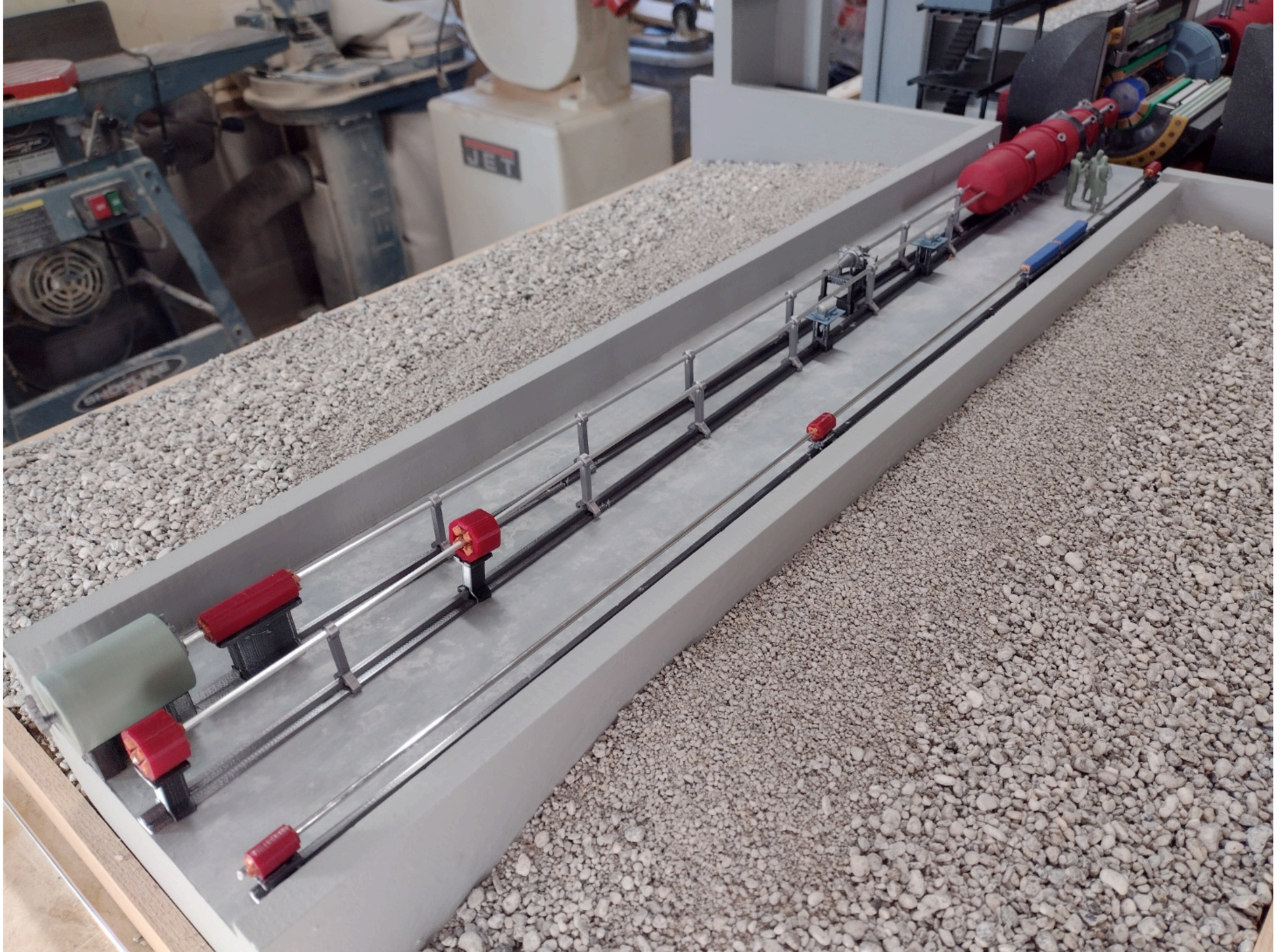
T. Ullrich

Brookhaven National Laboratory

EIC IP6 Model:

Project with other for the open house day at JLab and at BNL.

The artist is Walt and 3D printers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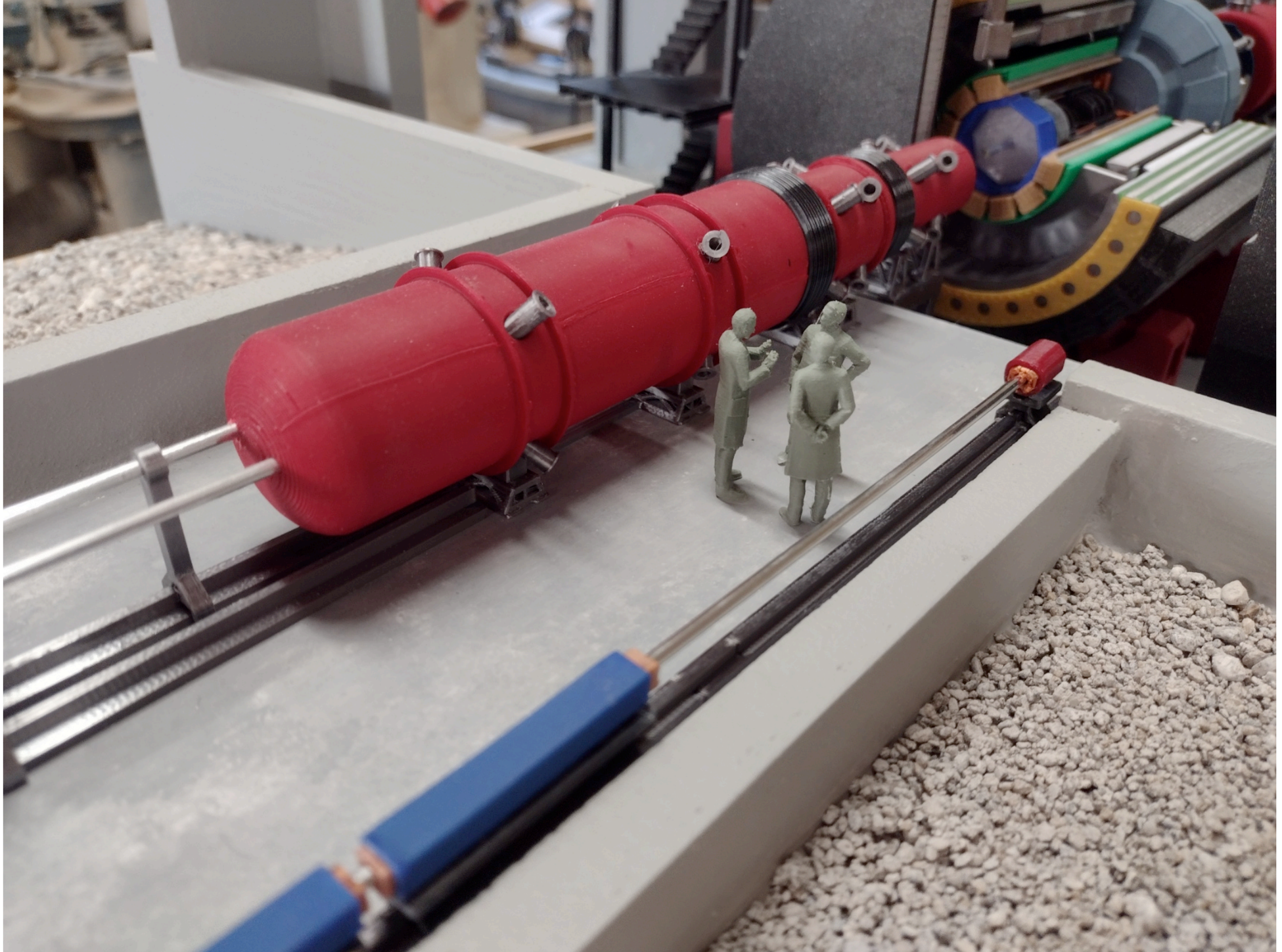

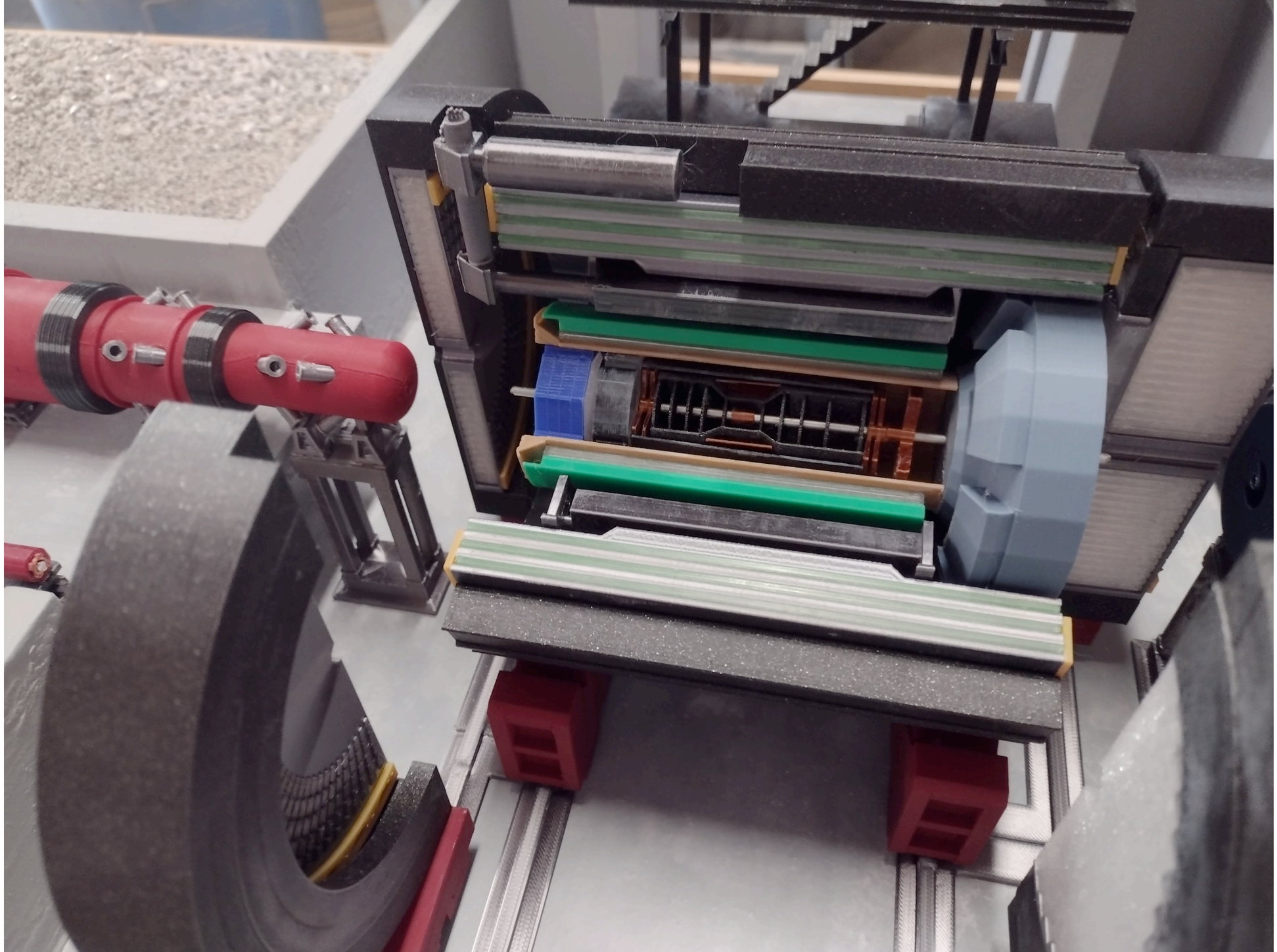

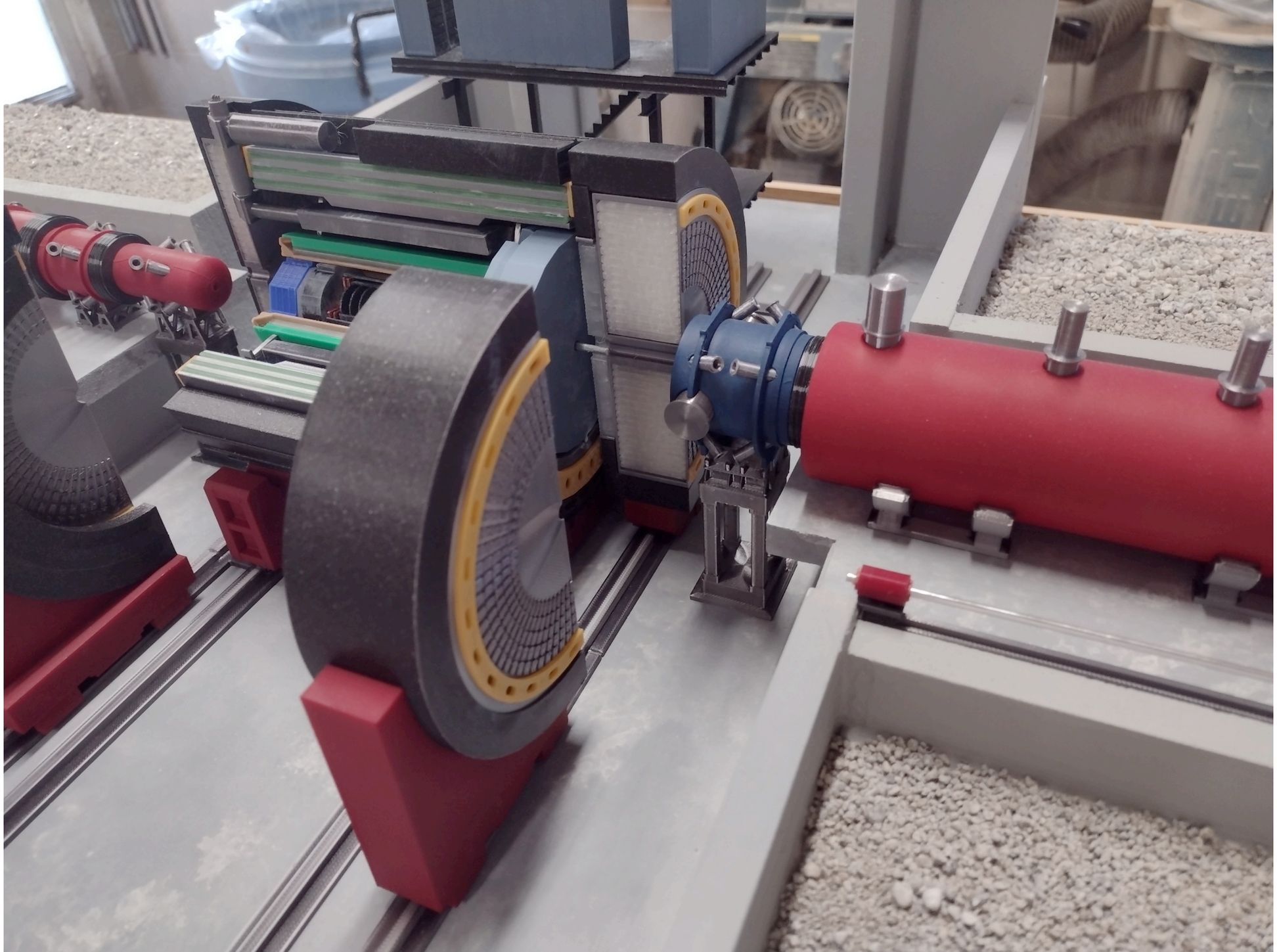

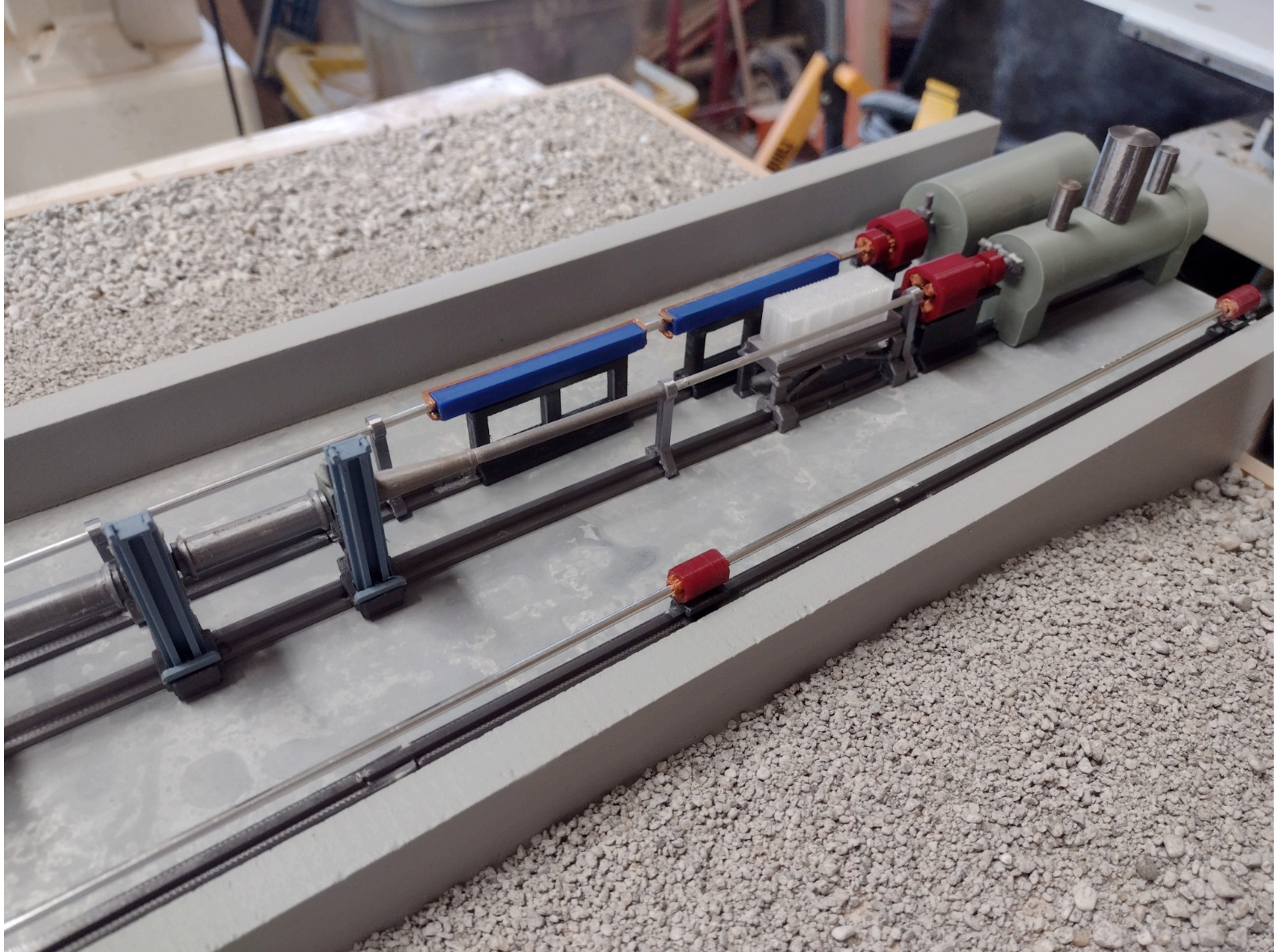

Report of the NSAC Facilities Subcommittee

On December 1, 2023, the Department of Energy Office of Science issued a charge to the federal advisory committees to "consider what new or upgraded facilities in your disciplines will be necessary to position the Office of Science at the forefront of scientific discovery." We were directed to consider projects over $100 million that are envisioned for the next decade (see Appendix A for the full charge) and form a subcommittee to evaluate, for each project, (i) the potential to contribute to world-leading science in the next decade and (ii) the readiness for construction.

As directed in the charge letter, the DOE Office of Nuclear Physics (DOE NP) provided a list of projects to the Nuclear Science Advisory Committee (NSAC), along with their current status:

- Electron-Ion Collider (EIC)
- High-Rigidity Spectrometer (HRS)
- Ton-Scale Neutrinoless Double-Beta Decay (TS-NLDBD)
- Project 8
- Facility for Rare Isotope Beams Energy Upgrade (FRIB400)
- Solenoidal Large Intensity Device (SoLID)
- Electron-Ion Collider (EIC) Detector II

Report of the NSAC Facilities Subcommittee

[…]

The Electron-Ion Collider (EIC), to be built in the United States, will elucidate the origin of visible matter in the universe and significantly advance accelerator technology as the first major new advanced collider to be constructed since the LHC. Neutrinoless double beta decay experiments have the potential to dramatically change our understanding of the physical laws governing the universe." These two projects have been evaluated by the nuclear science community as absolutely central to maintaining U.S. leadership in the field and answering the key scientific questions of our time. Recommendation #4 encompasses additional projects and new strategic opportunities to advance discovery science. The remaining projects we were asked to evaluate as part of this charge are examples of strategic opportunities to advance discovery science. These additional projects are critically important to the field and to maintaining U.S. leadership in nuclear science. Several of the projects take advantage of previous investments at national user facilities.

In considering the readiness for construction the Subcommittee was guided by the current status of the project and remaining challenges, including the DOE critical decision level, if any.

Report of the NSAC Facilities Subcommittee

Electron-Ion Collider (EIC) Detector II

Total Project Cost (TPC): TBD

The EIC project currently includes one large-acceptance detector, ePIC, that will capture most of the particles scattering from collisions of electrons and ions in all directions and at a wide range of energies. Detector II for the EIC will be complementary to the ePIC project detector, will focus its capabilities on

full exploration of phenomena discovered in the first phase of ePIC research, and will capitalize on the possibility of a secondary focus. Multiple detectors will expand scientific opportunities building on the discoveries already made with the ePIC detector, drawing a more vivid and complete picture of the science, providing an independent confirmation for discovery measurements, and adding critical statistics to systematics-limited measurements the EIC expects to perform.

Current status: Not an ongoing project, first international workshop held May 2023.

Christine Aidala

Scientific importance categories: (a) absolutely central; (b) important; (c) lower priority; (d) don't know enough yet.

Readiness for construction categories: (a) ready to initiate construction; (b) significant scientific/engineering challenges to resolve before initiating construction; (c) mission and technical requirements not yet fully defined.

Project	**Scientific Importance**	**Readiness for Construction**
EIC	**a**	**a**
HRS	**b**	**a**
TS-NLDBD	**a**	**a**
Project 8	**b**	**c**
FRIB400	**b**	**a**
SoLID	**b**	**a**
EIC Detector II	**b**	**c**