

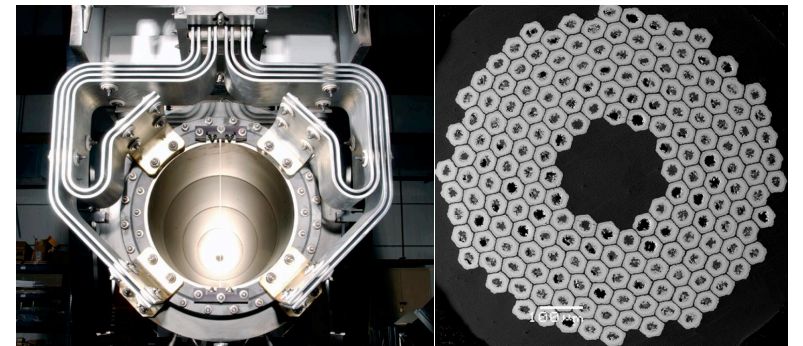
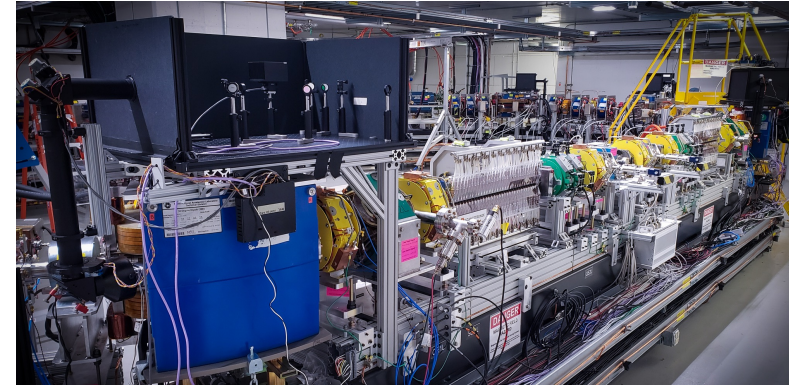


# Dedicated R&D Facilities for Accelerator Science and Technology

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# Snowmass highlighted critical role of AST R&D in next-gen HEP

- Accelerator Science and Technology (AST) R&D determines the technical feasibility and performance of next-generation HEP facilities and science programs
- Accelerator-Frontier summary and recommendations highlight essential nature of AST R&D and its inclusion in the full P5 process (<https://arxiv.org/abs/2209.14136>); also cf. Implementation Task Force (<https://arxiv.org/abs/2208.06030>).
- Strategic “hole” in collider R&D (US Nat. Collider Initiative)
- We should work hard to capture R&D opportunities at User Facilities (e.g. Fermilab accelerator complex, light sources, etc)
- ...but long-horizon AST R&D is largely incompatible with nature of User-Facility operations
- Support and expansion of **dedicated AST R&D facilities** in alignment with P5 report will help ensure successful execution of HEP vision



# FAST/IOTA: a center for Accelerator Science and Technology R&D

- **Dedicated AST R&D facility:** take novel AST from concept, to demonstration, to practice
- **Core program: intensity-frontier focus**
- Also, high-impact, cross-office R&D and collaborator-driven programs; strong education and training element
- **First demonstration** of ILC cryomodule accelerating-gradient spec; 31.5 MeV/m (2017)
- **First demonstration** of Nonlinear Integrable Optics (2020); operation on integer resonance
- **First demonstration** of Optical Stochastic Cooling (2021); >2000x increase in state-of-the-art frequency bandwidth

