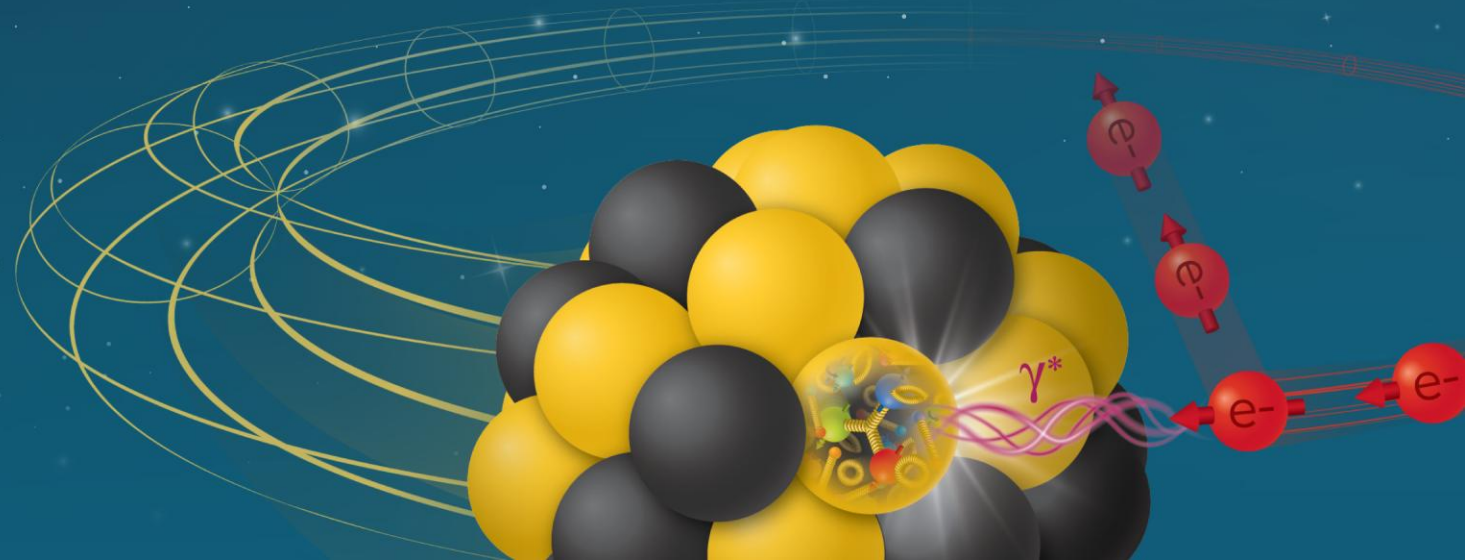


hpDIRC

Triple I Engineering Meeting Update
Alex Eslinger



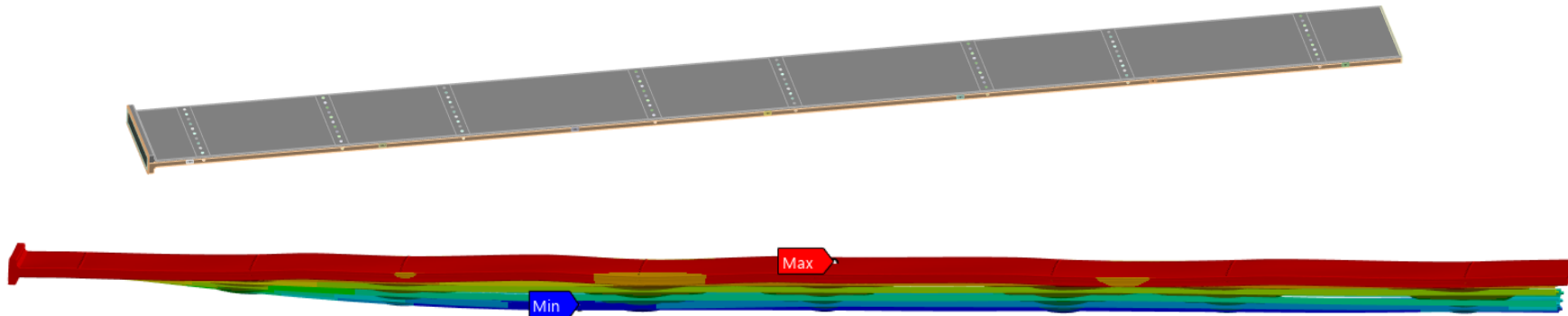
Electron-Ion Collider

Transition Summary

- Assumed responsibility for hpDIRC mechanical design in late January 2026
- Built initial understanding through weekly discussions, legacy hardware review, and recovery of prior files
- Observed BABAR disassembly and quartz bar refurbishment
- Re-established technical continuity with existing stakeholders and historical design work
- Identified bar box construction and manufacturability as immediate areas requiring further evaluation

Design Status

- Overall detector concept appears largely established
- Prior BABAR and PANDA DIRC work provides a strong foundation
- Several subsystems and analyses were already underway or partially developed
 - Quartz bars
 - Bar Boxes
 - Quartz Window
- Remaining work is refining the detector based on analysis and manufacturability



Key Constraints

- Stability and repeatability within ePIC appear to be the dominant overall constraint
- Calibration burden may be significant if alignment is not preserved
 - Two months is the current rough guess
 - Detector must be running (can't perform during bakeout, for example)
- Support structure behavior, GST deflection, and local integration effects are key concerns
- Internal bar box constraints also remain critical, especially deflection and optical continuity
- The BABAR design had $\sim 2.5x$ more relaxed resolution standard

CF vs Aluminum

- Carbon fiber has been the assumed basis for the current geometry and packaging
- Aluminum has re-emerged as a comparison point because of familiarity and precedent
- The trade is not simple, since legacy aluminum construction involved hexcell paneling with major cleanliness concerns
- This is now a design decision that affects manufacturability, integration, cost, and long-term detector risk

Next Steps

- Consolidate current knowledge into a single design baseline
- Confirm the requirements that most strongly drive bar box and support design
- Perform a structured trade study of carbon fiber versus aluminum
- Use early manufacturing engagement and possible first-article work to reduce risk before major design commitment