

KILC12, 23-27 April 2012, Daegu, Korea

Joint ACFA Physics / Detector Workshop and GDE meeting on Linear Collider



QD0 Prototype Status

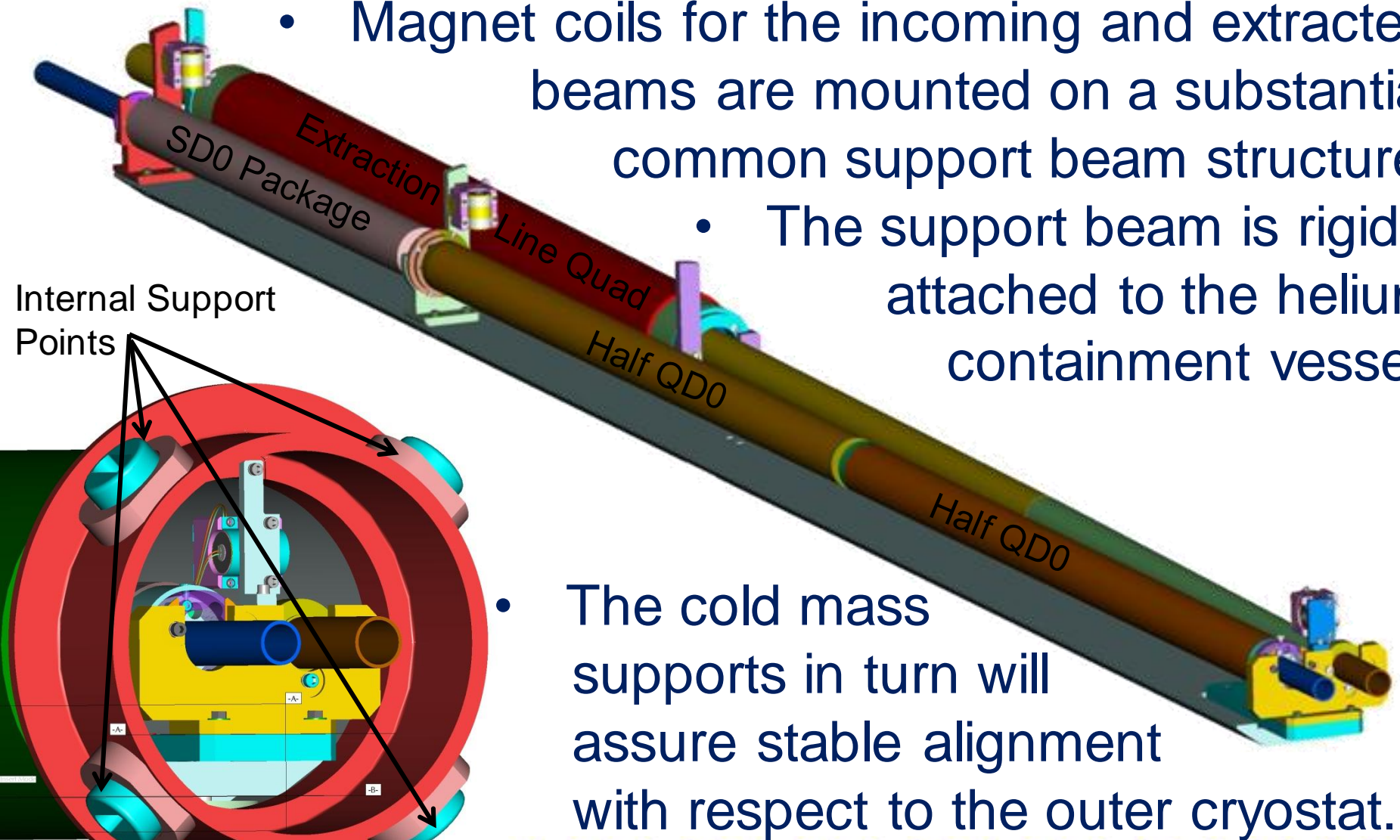
Presented by,
Brett Parker, BNL-SMD

Outline: QD0 Prototype Status Report

- Review (remind) QD0 design details and philosophy.
- Discuss expectations for QD0 R&D prototype magnet & service cryostat construction and testing in US FY2012.
- Report on a new synergy with SuperKEKB work.

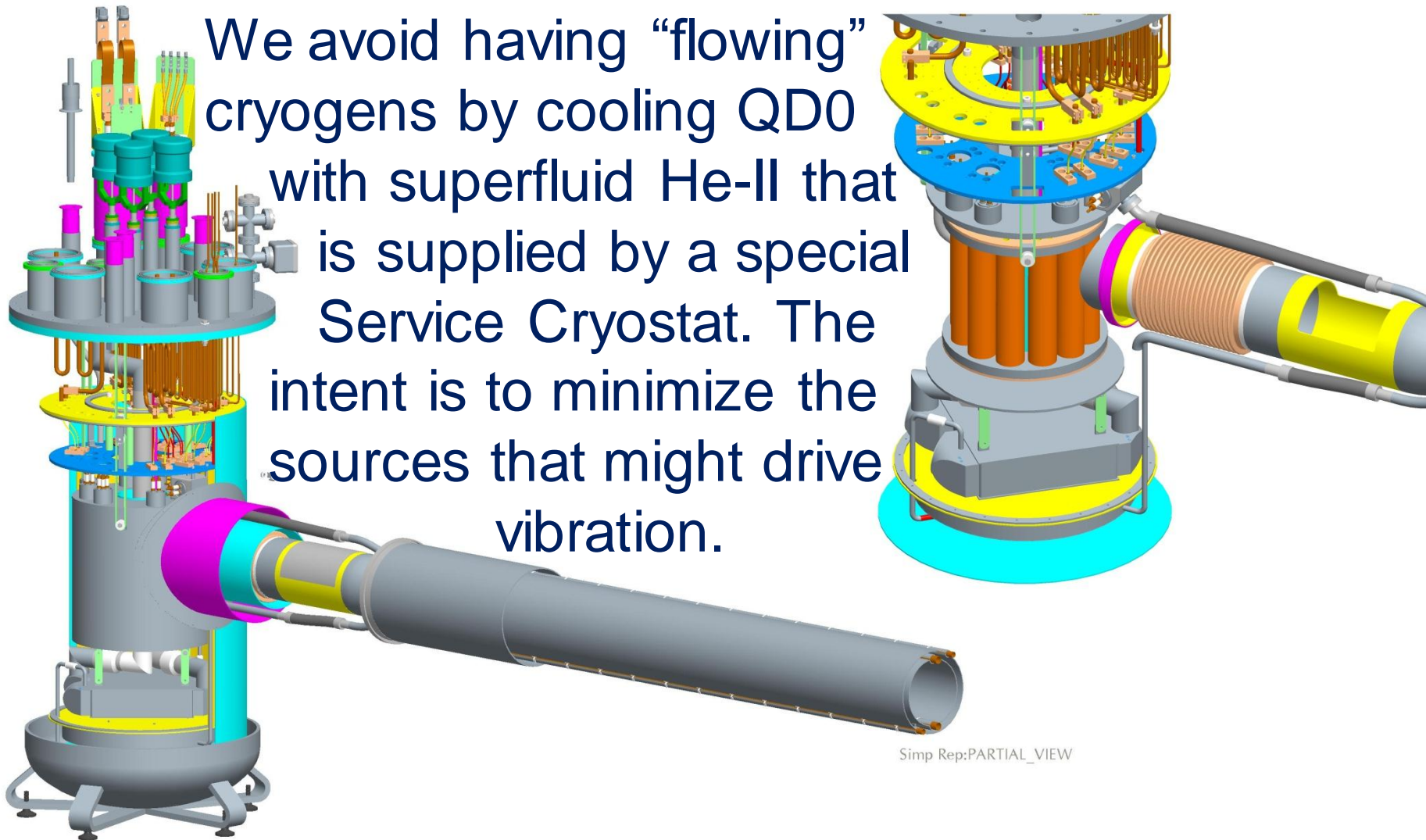
ILC TDR QD0 Design Configuration

- Magnet coils for the incoming and extracted beams are mounted on a substantial common support beam structure.
 - The support beam is rigidly attached to the helium containment vessel.
- The cold mass supports in turn will assure stable alignment with respect to the outer cryostat.

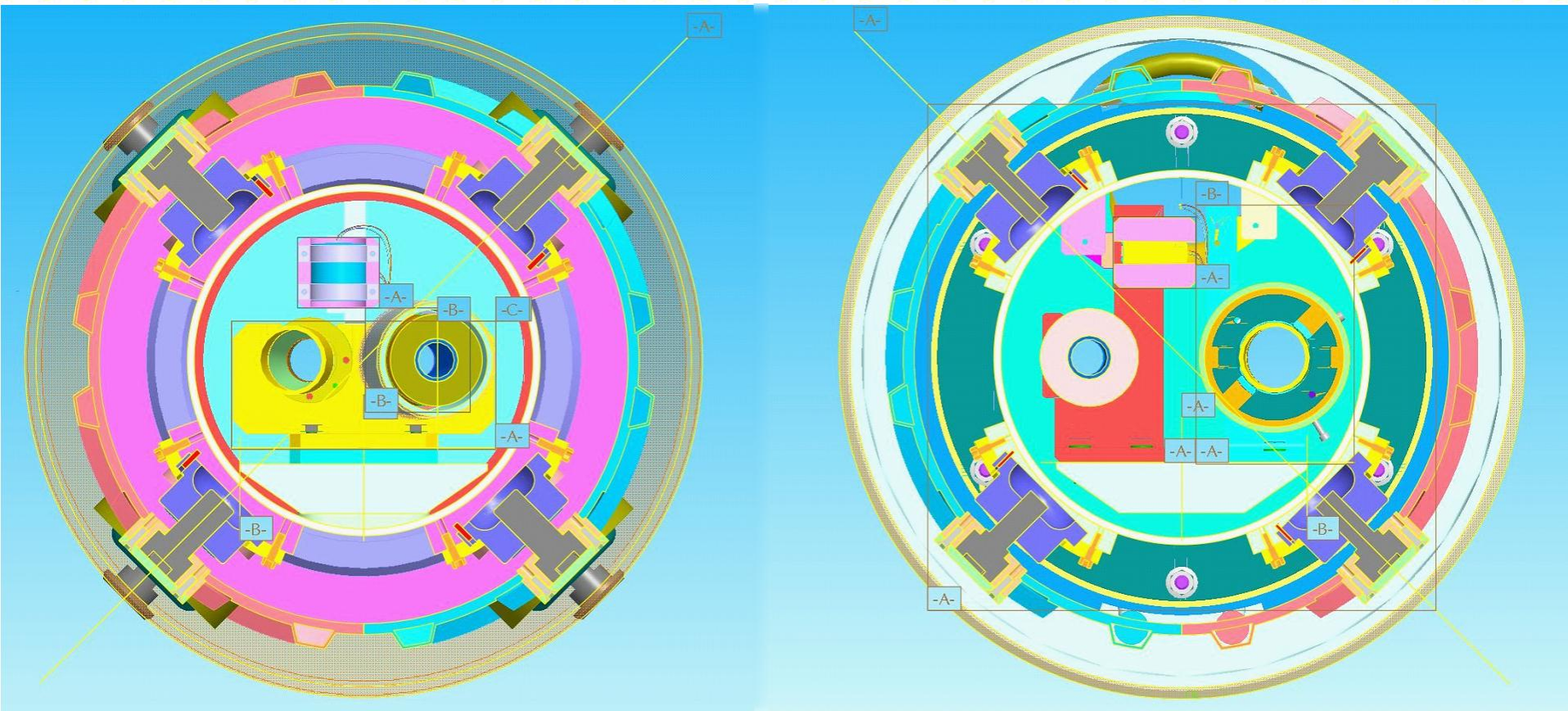


... and the QD0 Service Cryostat Design

We avoid having “flowing” cryogens by cooling QD0 with superfluid He-II that is supplied by a special Service Cryostat. The intent is to minimize the sources that might drive vibration.

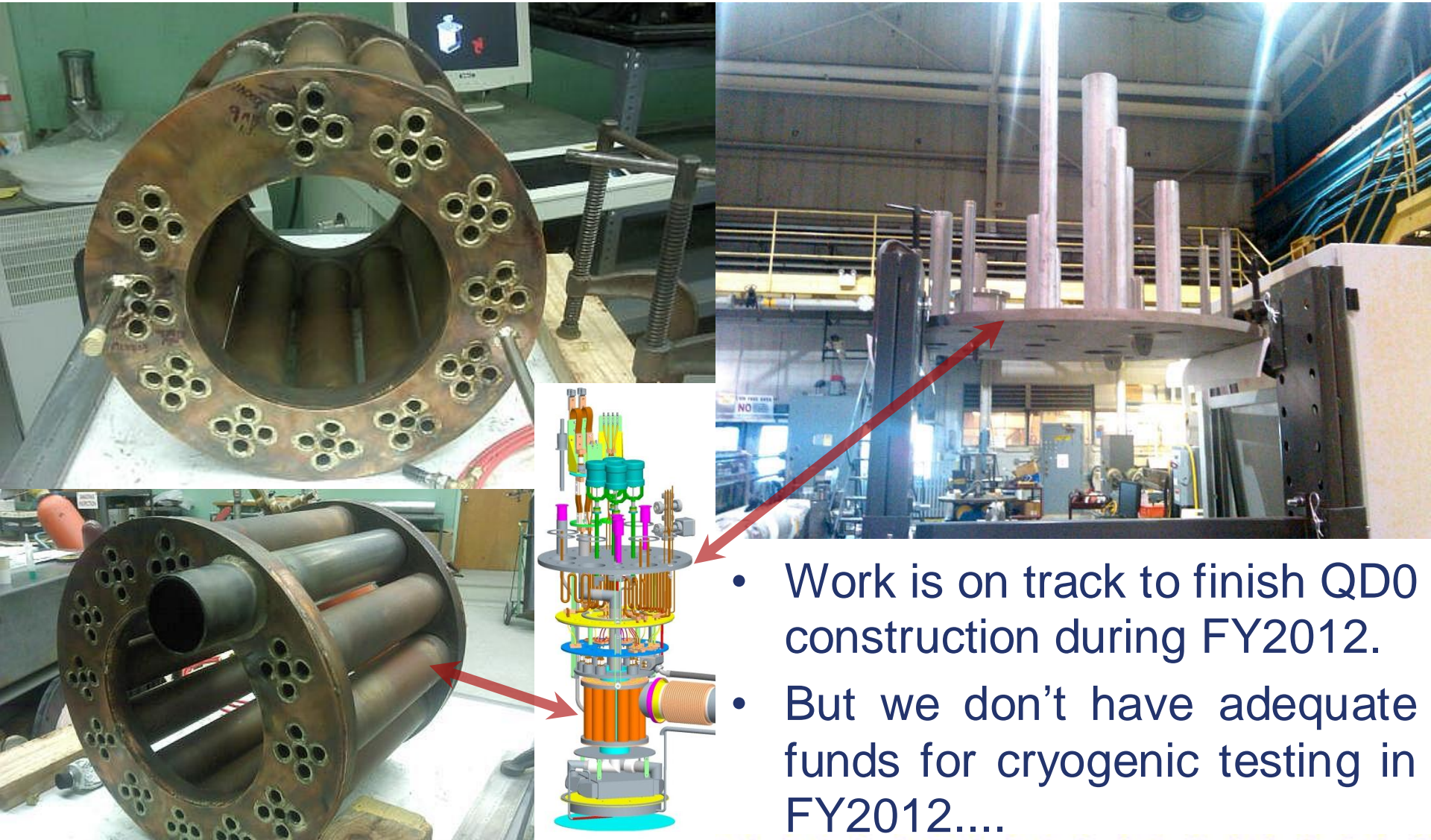


QD0 Support Structure CAD Section Views



Cold mass & outer cryostat are assembled together then machined to make tight fighting support keys that constrain the inner & outer vessels to move together.

Manufacturing QD0 Service Cryostat Parts

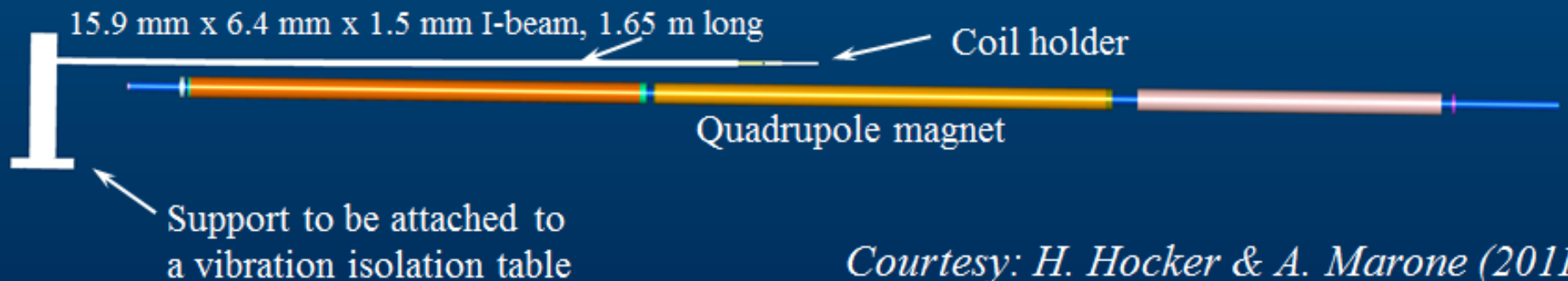
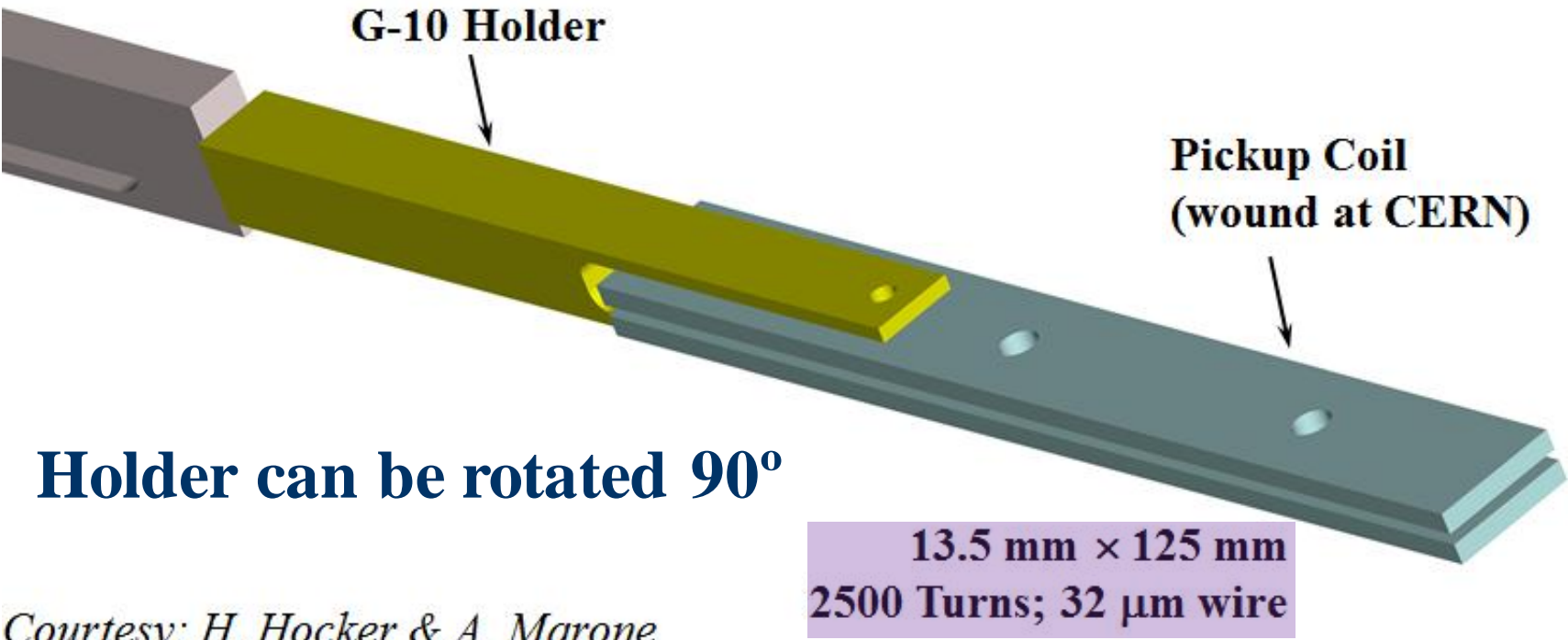


- Work is on track to finish QD0 construction during FY2012.
- But we don't have adequate funds for cryogenic testing in FY2012....

24 April, 2012
KILC12, Daegu

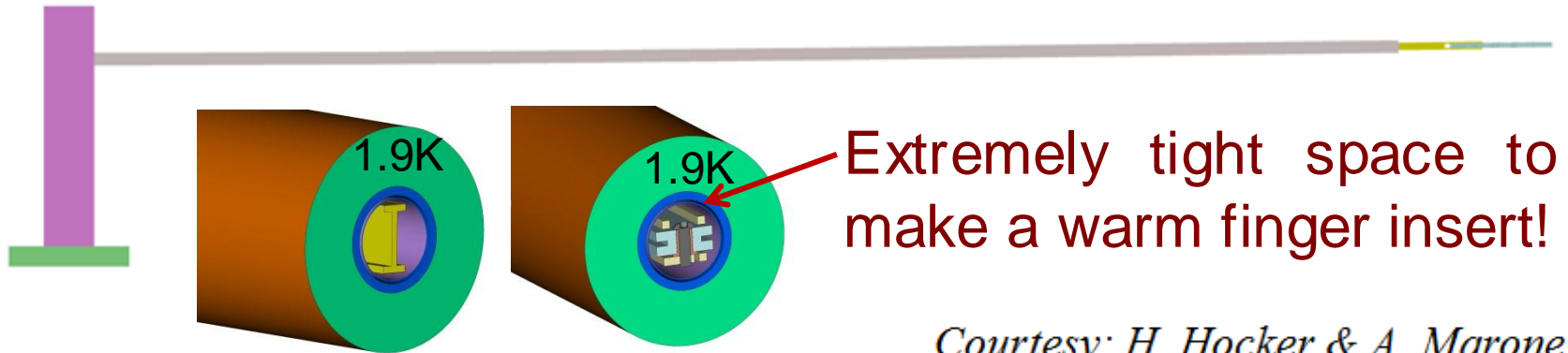
“QD0 Prototype Status,”
B. Parker, BNL-SMD

Concept to Measure Magnetic Center Changes.

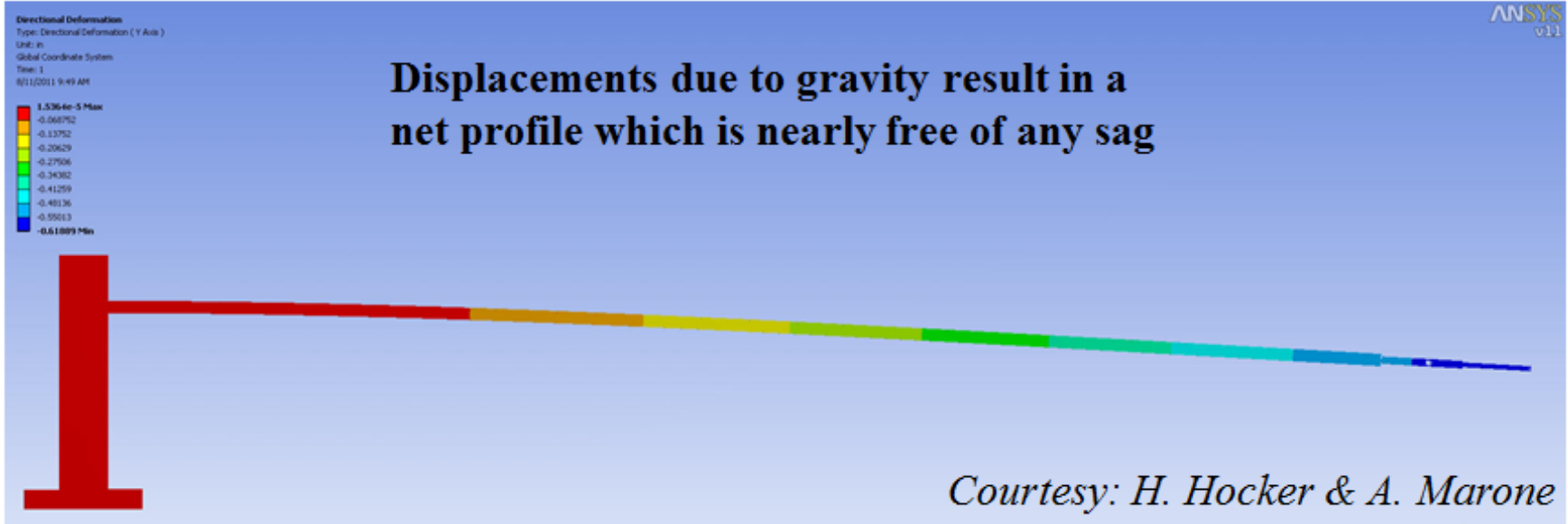


How to get measurement coil inside QD0?

The I-beam is fabricated with an upward curvature

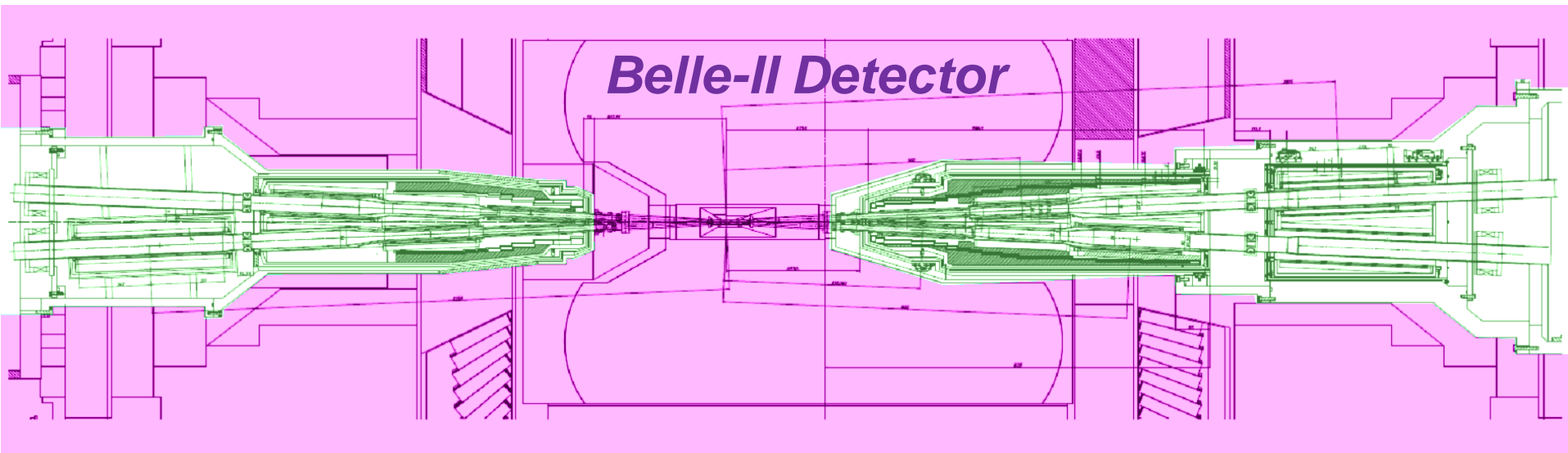


Courtesy: H. Hocker & A. Marone



Courtesy: H. Hocker & A. Marone

Vibration Measurement Synergy with SuperKEKB



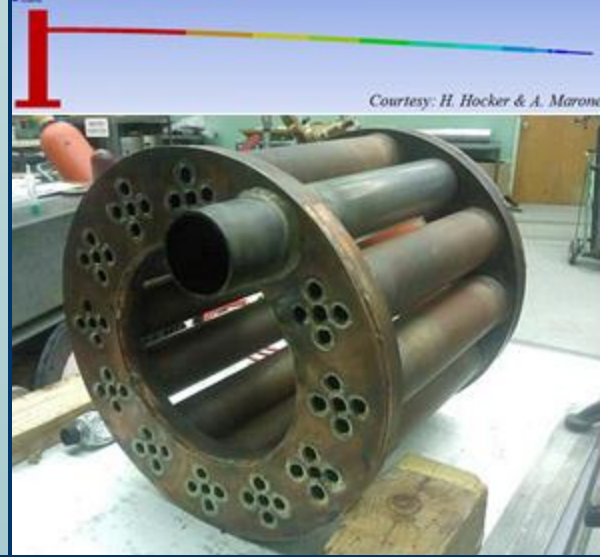
- SuperKEKB goal is a factor 50 luminosity increase with respect to the previous world record KEKB luminosity.
- To achieve this they use “nanobeam” IR optics that have beam spot stability requirements that are similar to ILC.
- In fall of 2012 we look to do R&D aimed at developing measurement techniques for in situ vibration studies.

Daegu QD0 Status Snapshot in Time.

- *We have learned what is needed to wind long, slender ILC QD0 coils.*
- *We have new mechanical scenario for how to install and support QD0 in SiD; ILD is also developing their solution.*
- *We expect to have an ILC style QD0 IR magnet system for warm vibration tests; funding is needed for cold tests.*
- *Look to make the most of synergy with SuperKEKB and CLIC stability studies.*
- *We also have ATF2 FF upgrade coils.*



Displacements due to gravity result in a net profile which is nearly free of any sag



Courtesy: H. Hocker & A. Marone