

LHC Cryo-collimators for Phase 2: WP 15 Progress report

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**A. Bertarelli, A. Dallocchio, Ch. Mucher, D. D. Ramos,
Th. Renaglia, M. Timmins**



OUTLINE

- **WP Context**
- **TCRYO Specifications (as understood)**
- **Status of Solution 1 (Warm)**
 - **Open issues**
- **Status of Solution 2 (Cold)**
 - **Open issues**



WORK PACKAGE CONTEXT

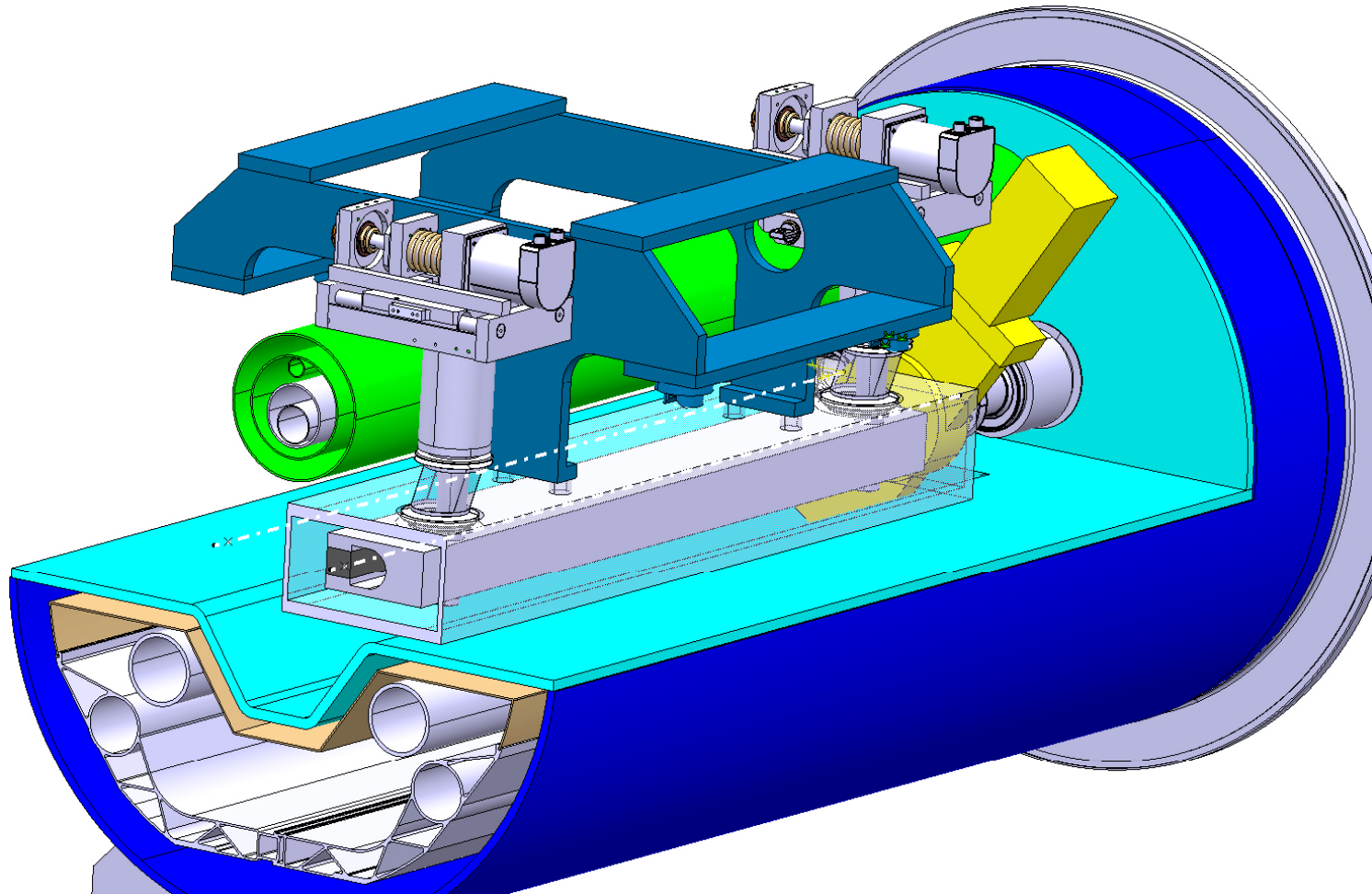
- Work-package 15 of Minimized Phase 2 Collimation Plan (Integrated mechanical engineering of Cry-collimators and Cold-Warm transitions)
- Job opened to pre-study two alternative solutions by end of June 2010 assessing:
 - Optimal solution to be retained
 - Feasibility of 4 integrated units by 2012
 - Costs and resources
- Specifications for Superconducting / cryo-elements and interfaces provided by TE-MS
- Collaboration with EN-STI (Fluka and Motorization), TE-VSC, TE-CRG ...



TCRYO SPECIFICATIONS (AS UNDERSTOOD)

- 1 m long tungsten jaw (based on F. Cerutti's 2009 simulations) – factor 15 improvement
- Single jaw (latest Fluka simulations partly infirm this assumption – new decision to be taken) – big thanks to F. Cerutti for new fast simulation!!!
- No 5th axis movement
- RF tapering and transitions (?)

CRYO-COLLIMATORS: PRE-DESIGN 1



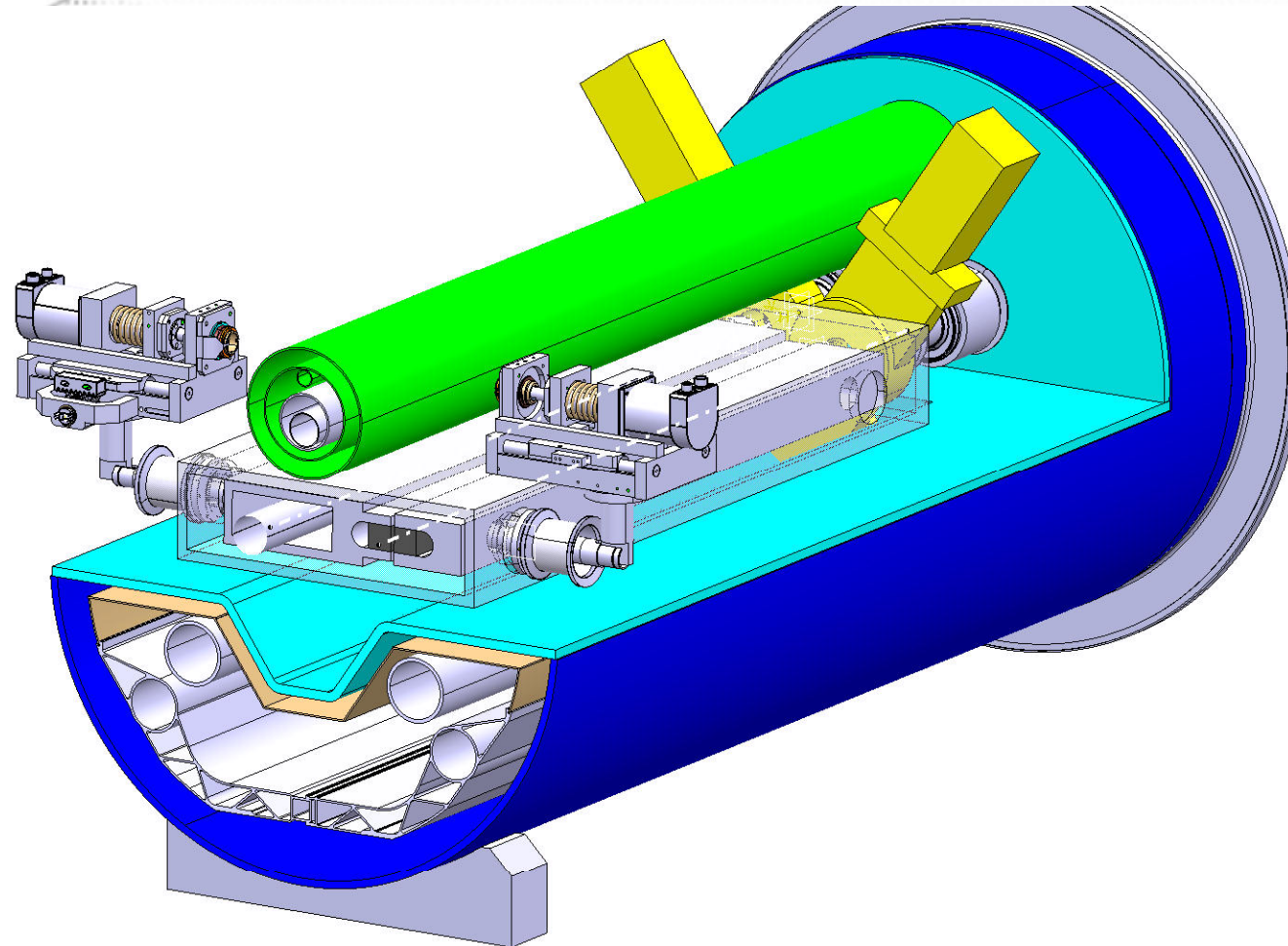


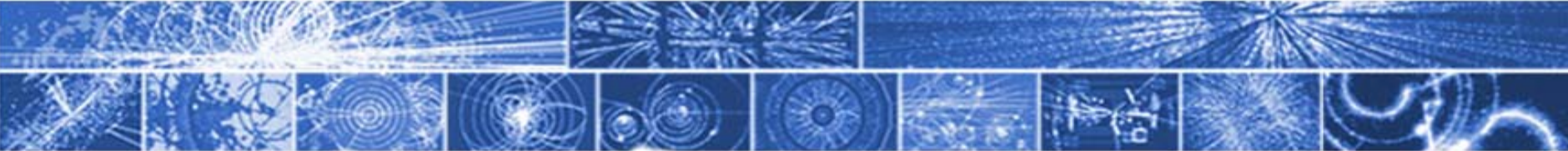
CRYO-COLLIMATORS: PRE-DESIGN 1

Features and issues:

1. ~4 m long between interconnection planes
2. Bus-bar routing yet to be analyzed
3. W-type bellows to be restudied if 800 mm accessibility is required for interconnection intervention
4. Special cryostat and X-Line unmountable
5. Lateral displacement (~4 cm) to be verified for transport, integration etc.
6. Is coldwon before collimator installation possible? Safety issue?
7. Is 200mm tapering necessary?
8. Additional bellows required for collimator adjustment
9. Second jaw is theoretically conceivable but very hard to integrate (beam 2 line to be by-passed)

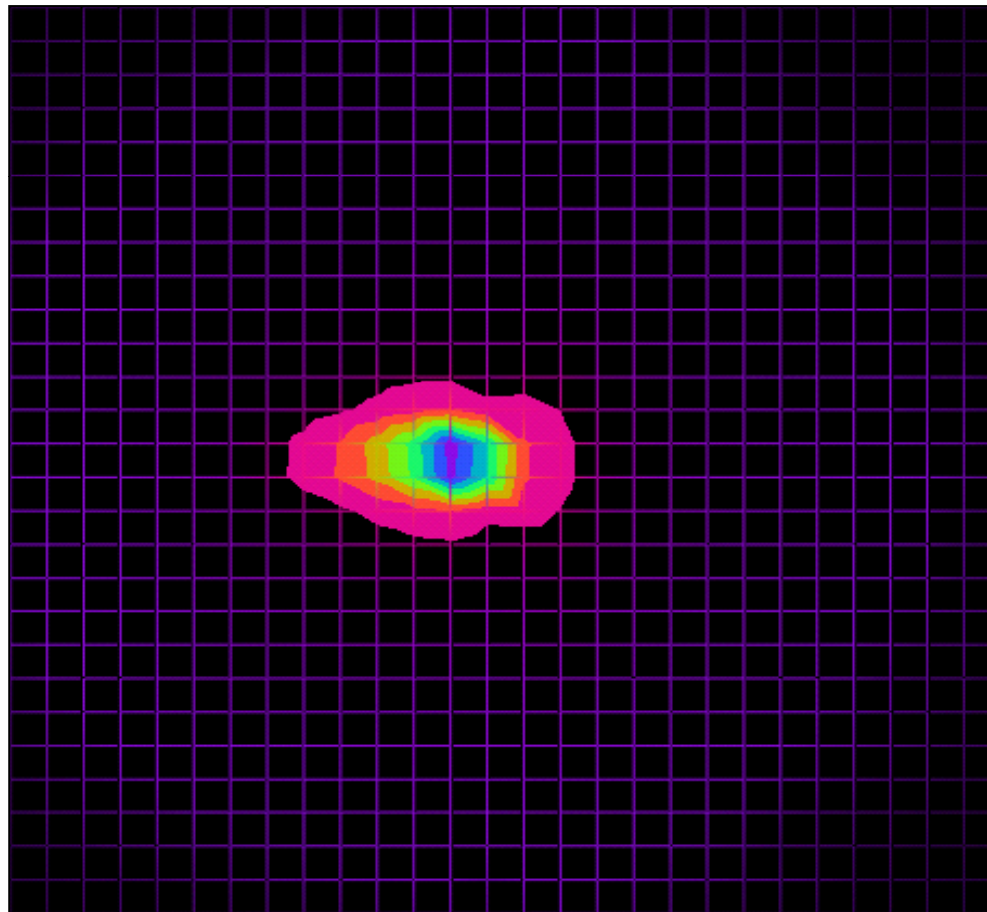
CRYO-COLLIMATORS: DESIGN 1



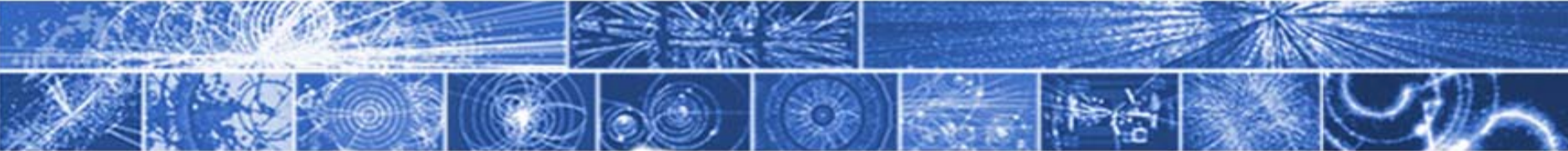


CRYO-COLLIMATORS: PRE-DESIGN 2

Heat Load

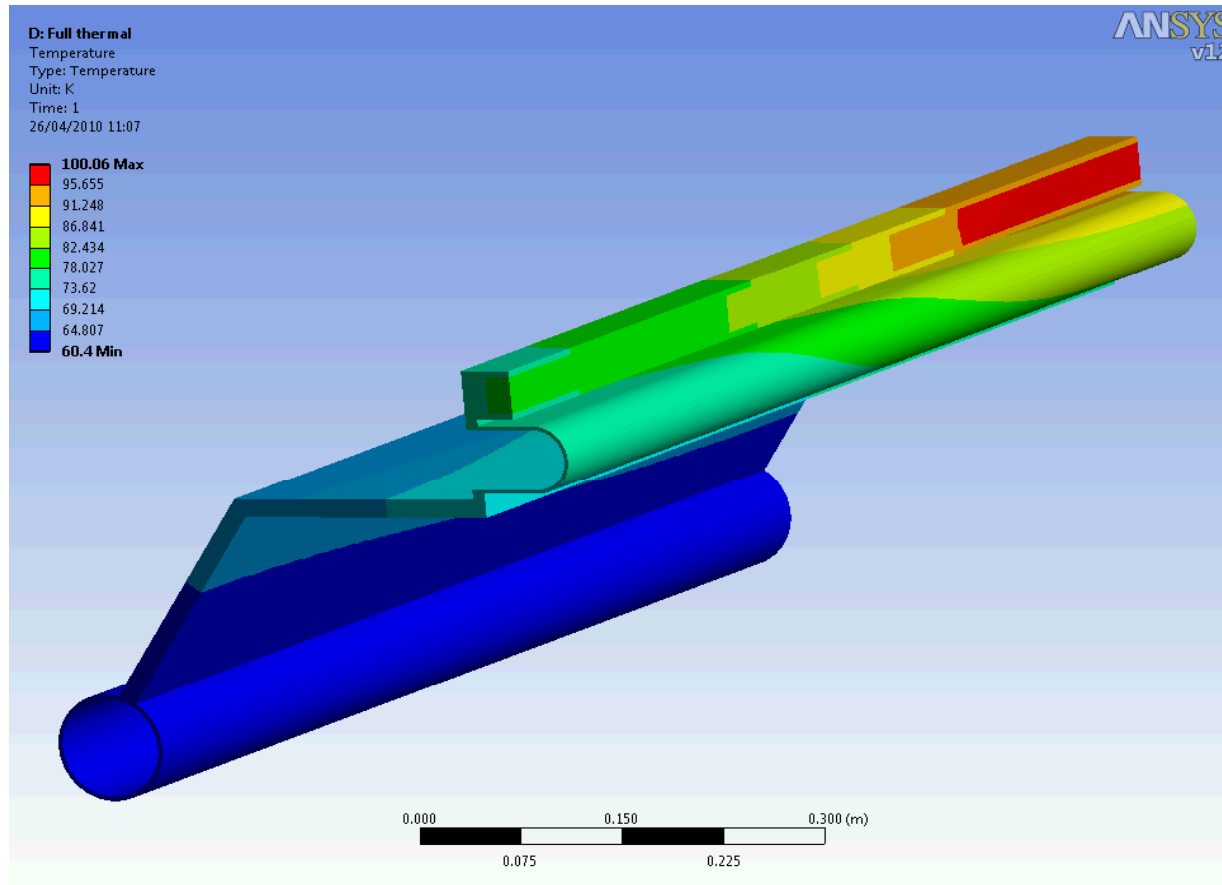


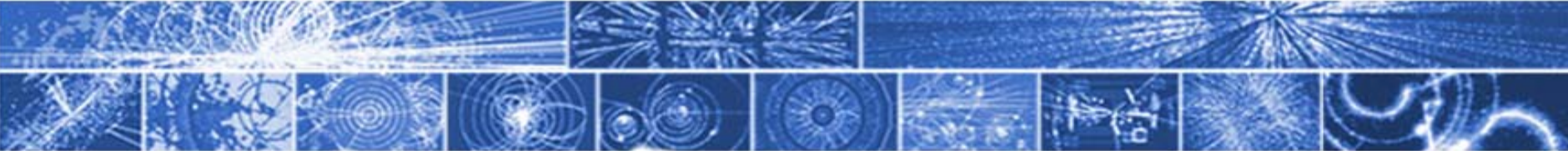
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CRYO-COLLIMATORS: PRE-DESIGN 2

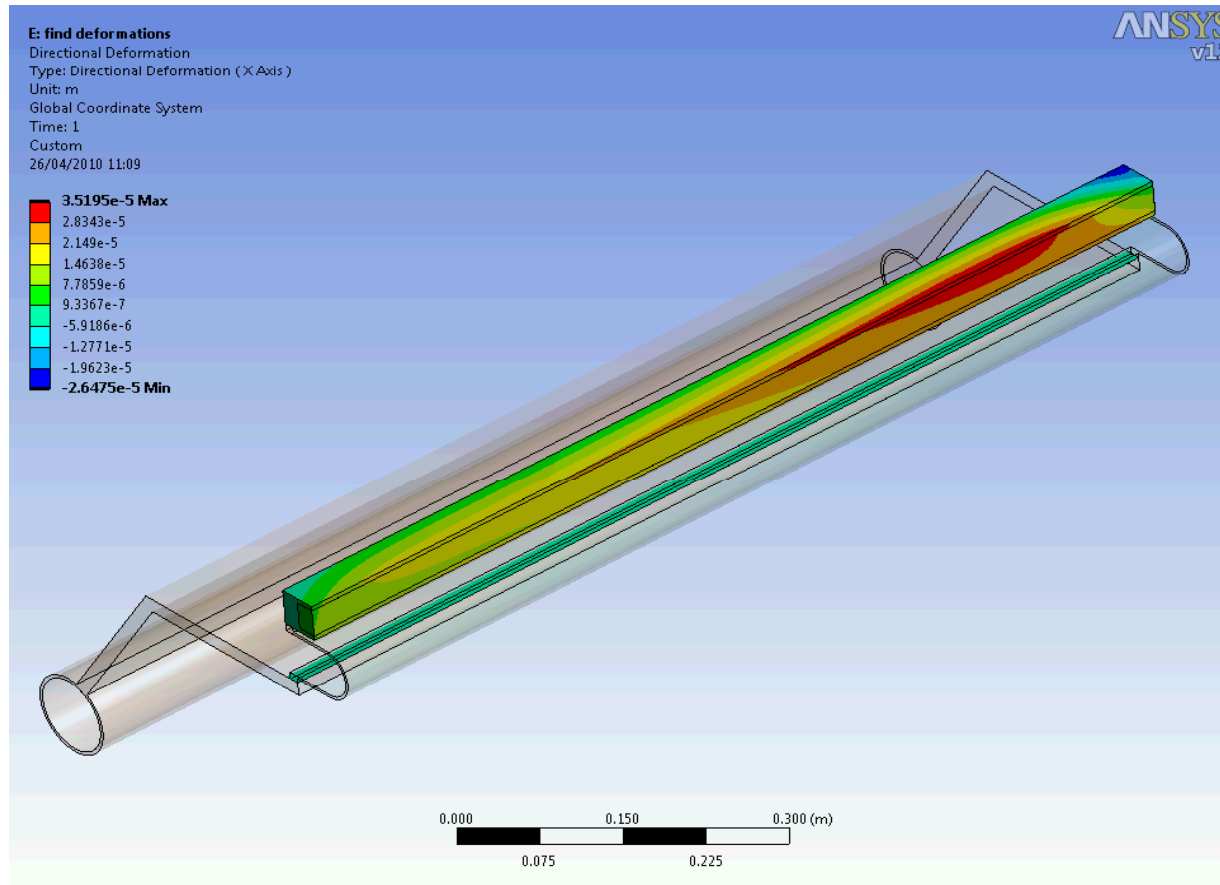
Temperature

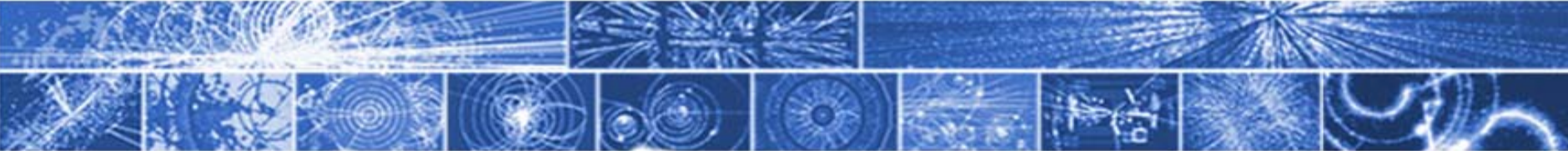




CRYO-COLLIMATORS: PRE-DESIGN 2

Deformation in Y-axis





CRYO-COLLIMATORS: PRE-DESIGN 2

Max principal stress

