

# ILC Interaction Region Engineering Design Workshop 07

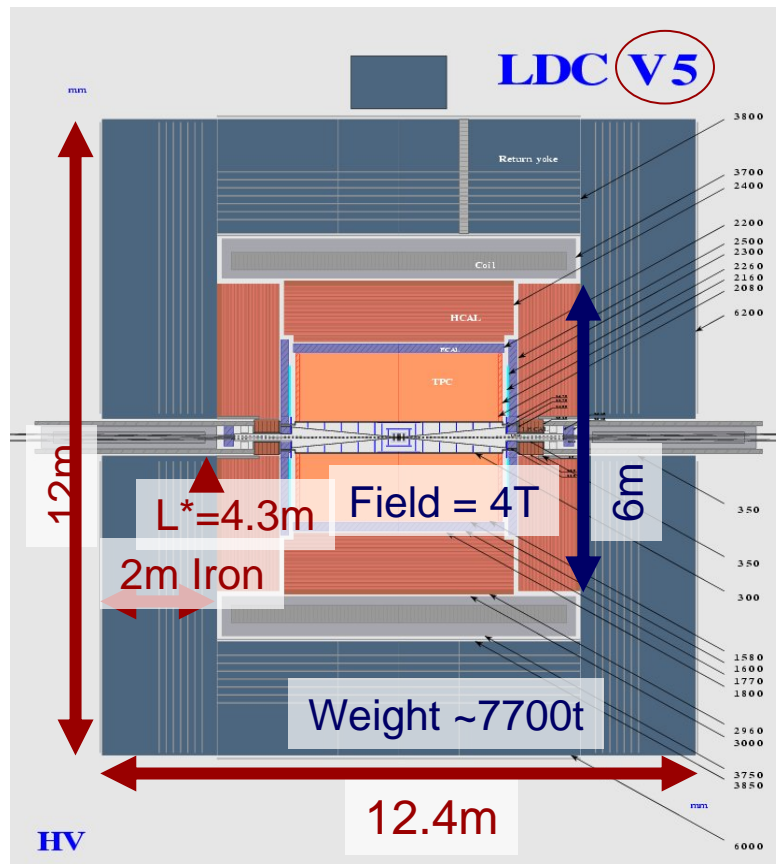
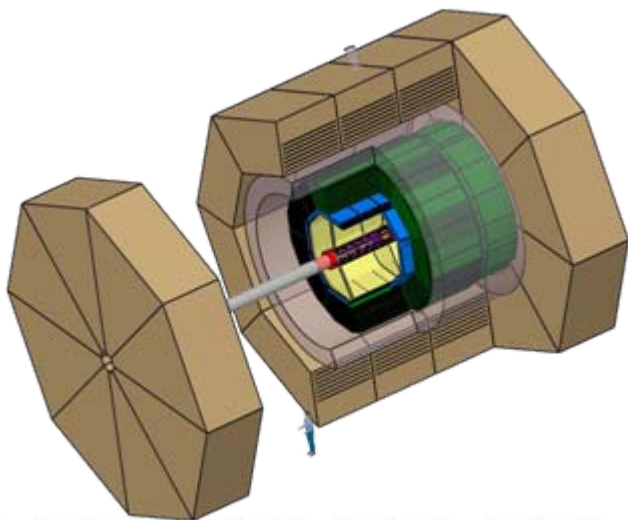
## *Detectors interfaces summary*

September 17-21 at SLAC

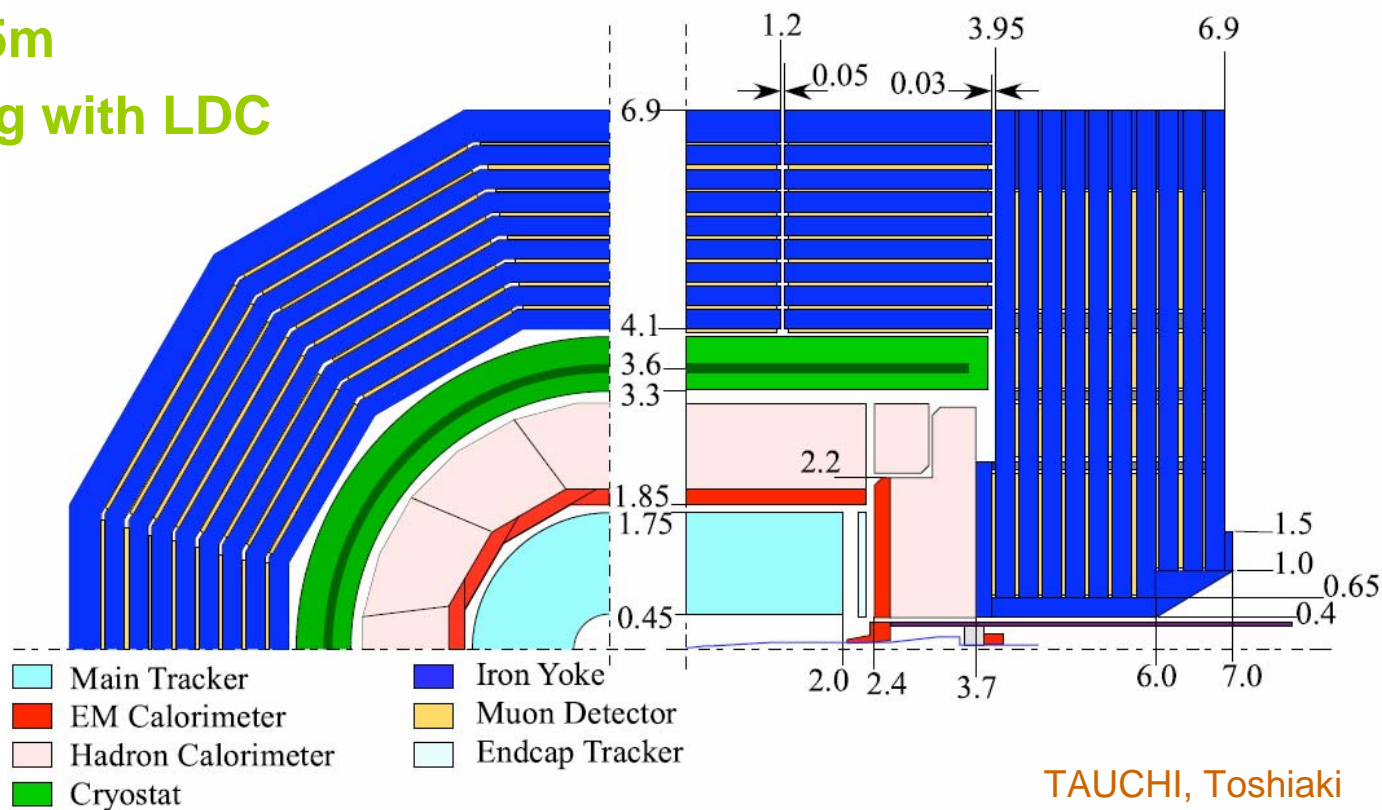
- Prepare EDR in 2010
- Review and advance the subsystems in IR
  - QDO
  - Beam pipe and pumping
  - Forward region sub detectors
  - End Cap design
- Define the detectors needs
  - Services
  - IR Hall design
  - Crane capacity (in cavern & on surface)
- Review the push-pull solutions

- Detectors overview
  - LDC
  - GLDc
  - SiD
  - 4<sup>th</sup> concept
- End Cap design
- Forward region
  - Final Doublet (QD0)
  - Vacuum
  - Forward Cal
- Push-Pull
- IR Hall design
- Conclusions

- LDC
  - Based on Tesla concept
  - Assembly a la CMS
  - Weight : 7700 t
  - B : 4T
  - $L^*$  : 4,3m
  - Merging with GLD



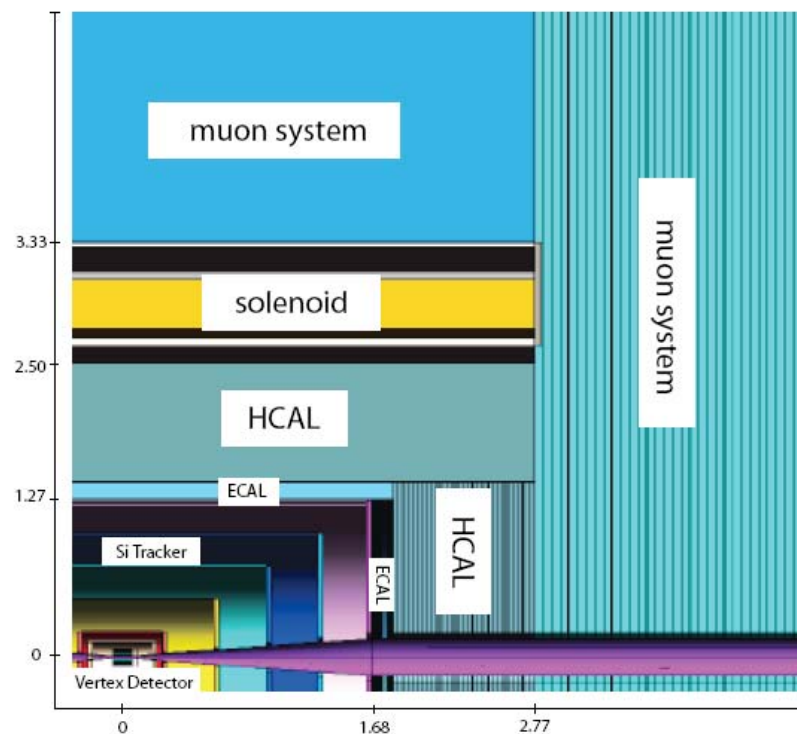
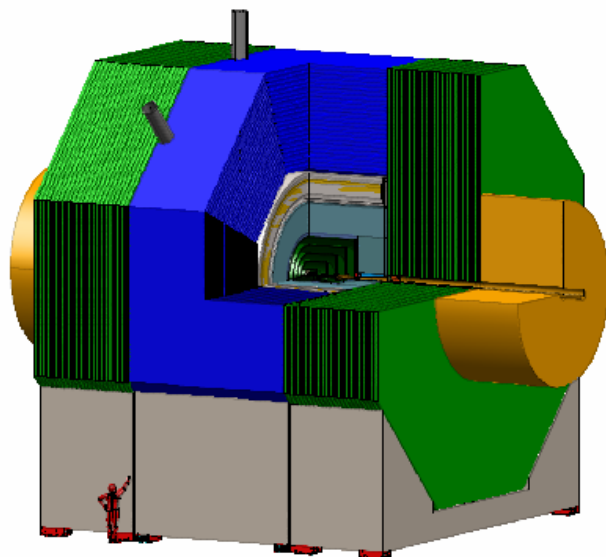
- $GLDc = (GLD + LDC)/2$ 
  - **B : 3,5 T**
  - **Weight : 13 000 t**
  - **L\* : 4,5m**
  - **Merging with LDC**



TAUCHI, Toshiaki

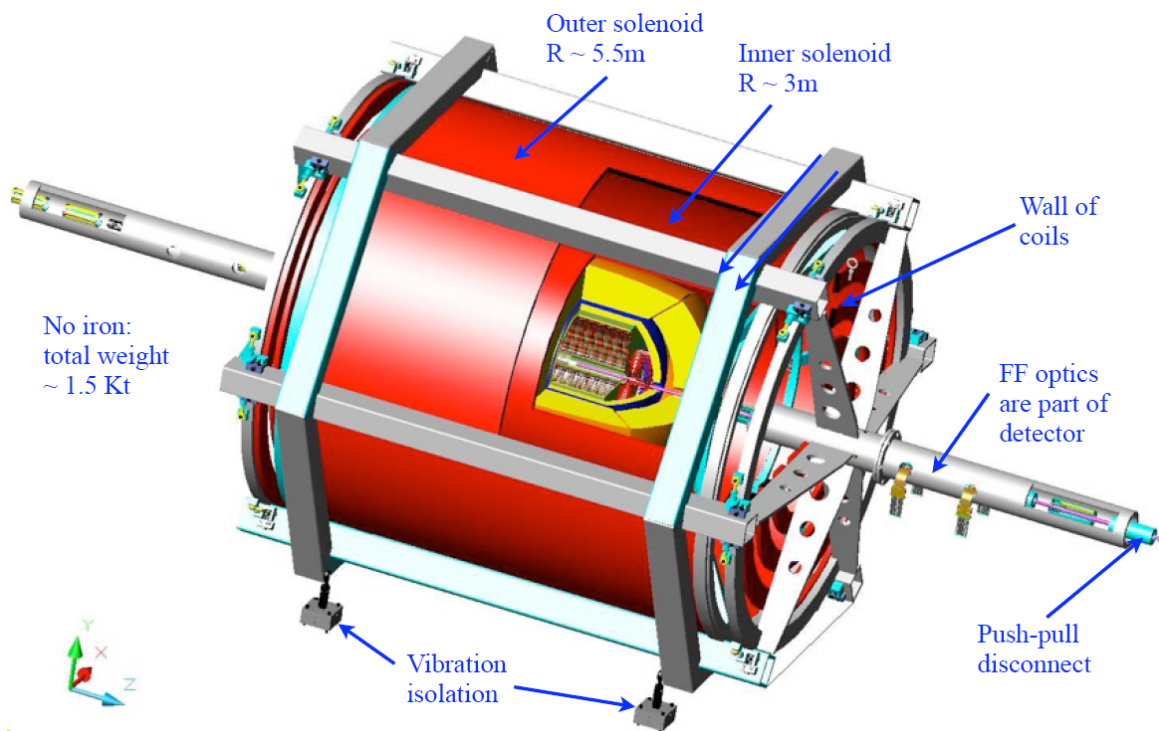
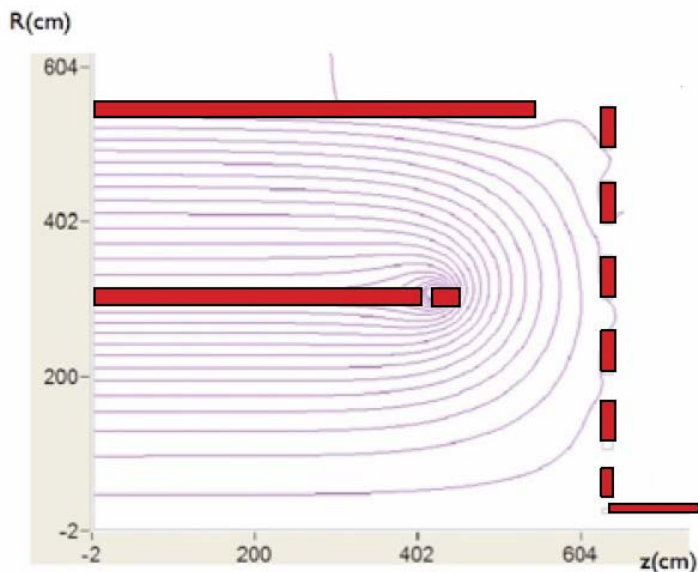
- SiD

- $L^*$  : 3,664m
- B : 5T
- Weight : 10 000 t



BREIDENBACH, Martin

- 4<sup>th</sup> concept
  - Weight : 1500 t (No return Yoke)
  - B : 3,5T
  - L\* : 2 – 4 m



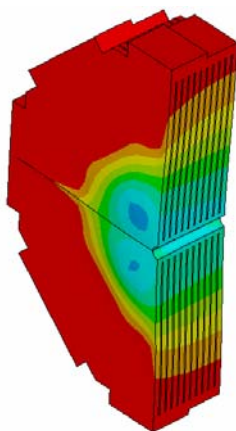
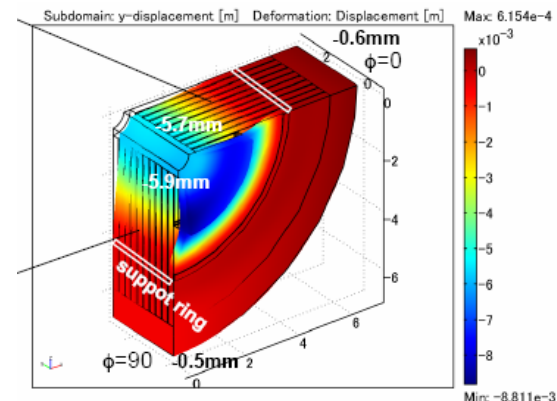
HAUPTMAN, John

- Functions

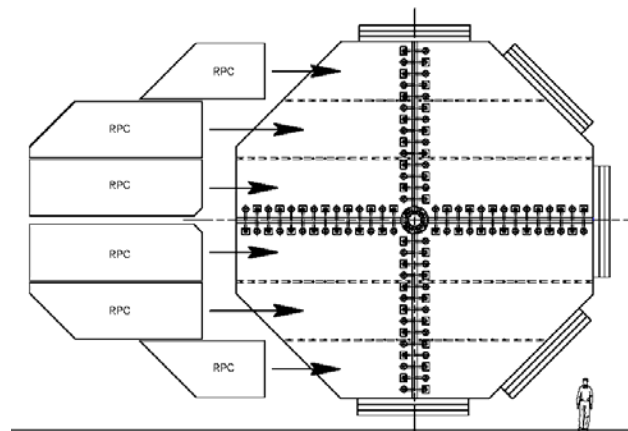
- Return the flux
- Allowed access to the detector
- Support inner subsystems

- Splitting / Not splitting

- GLDc : splitting with support ring
- SiD : not splitting



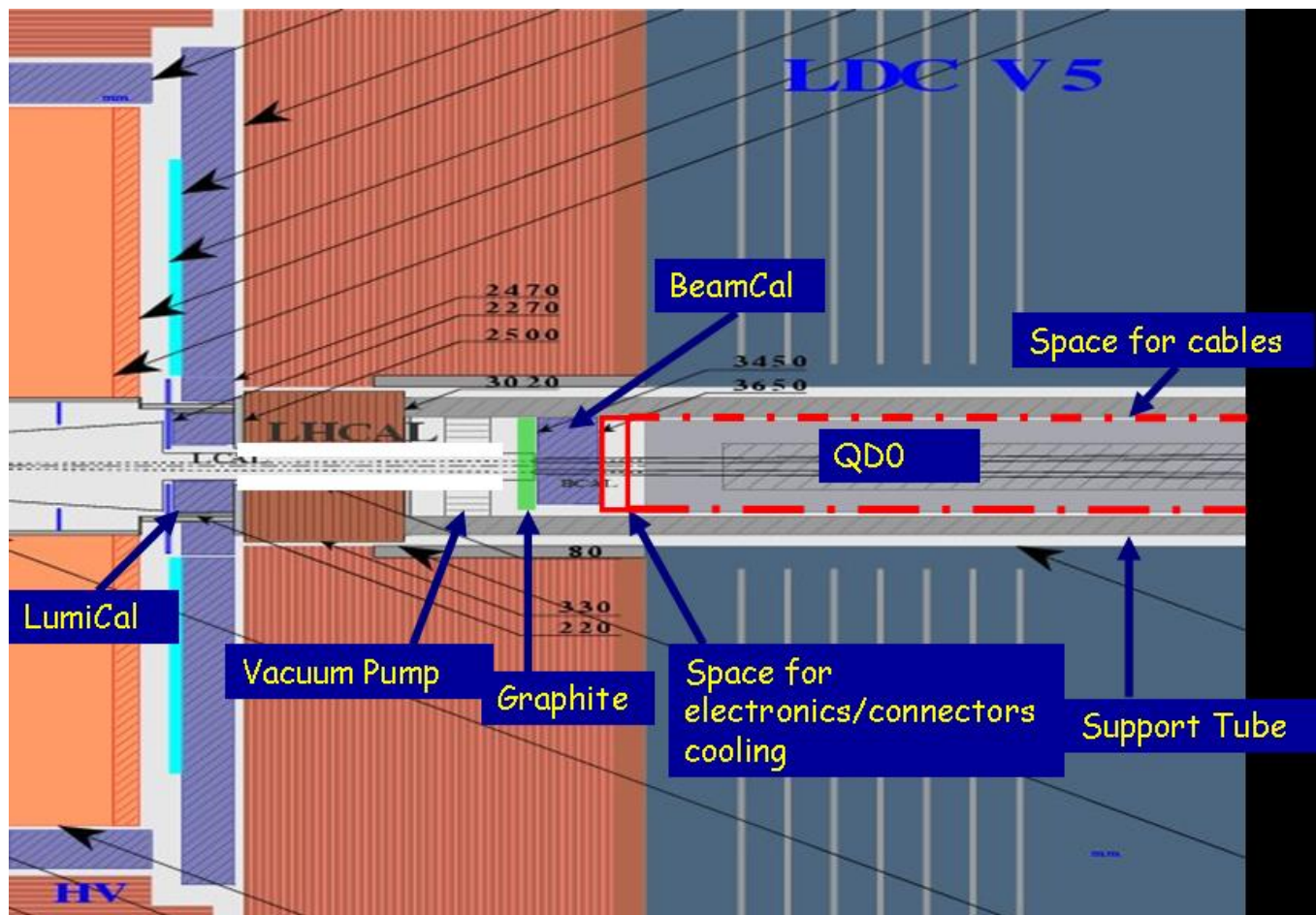
NODAL SOLUTION  
 STEP=1  
 SUB =1  
 TIME=1  
 UZ  
 TOP  
 REYS=0  
 CMX =2.852  
 CMN =-2.852  
 SMX =.071419  
 -2.852  
 -2.527  
 -2.202  
 -1.877  
 -1.553  
 -1.228  
 -.902961  
 -.578168  
 -.253375  
 .071410



Y. Sugimoto/T.Tauchi  
 H. James Krebs  
 Bob Wands

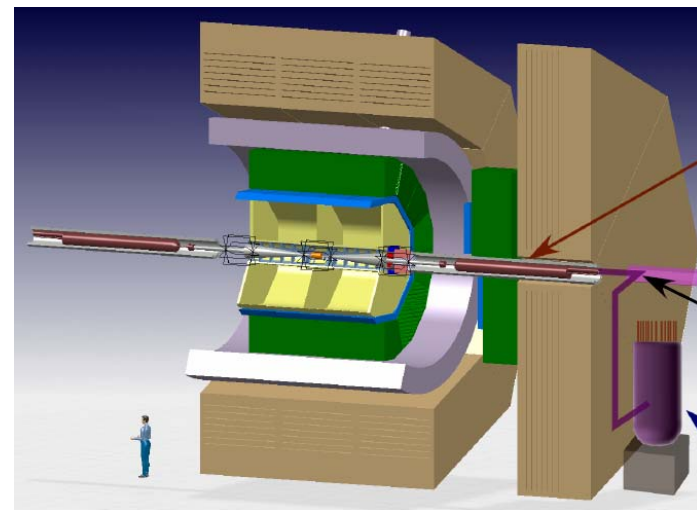
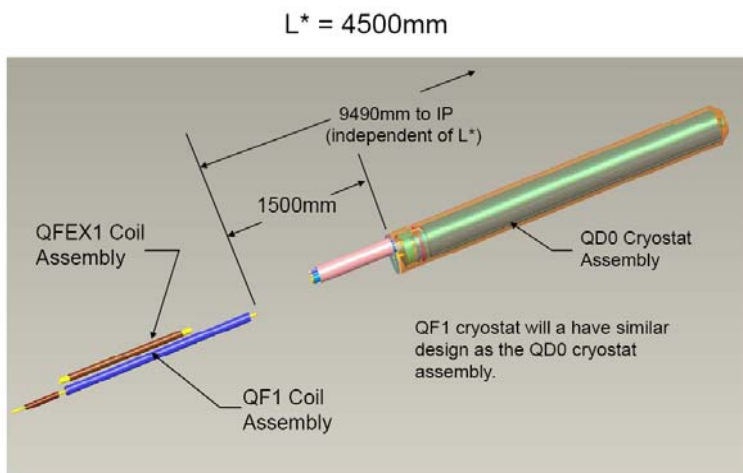


- Scheme for LDC



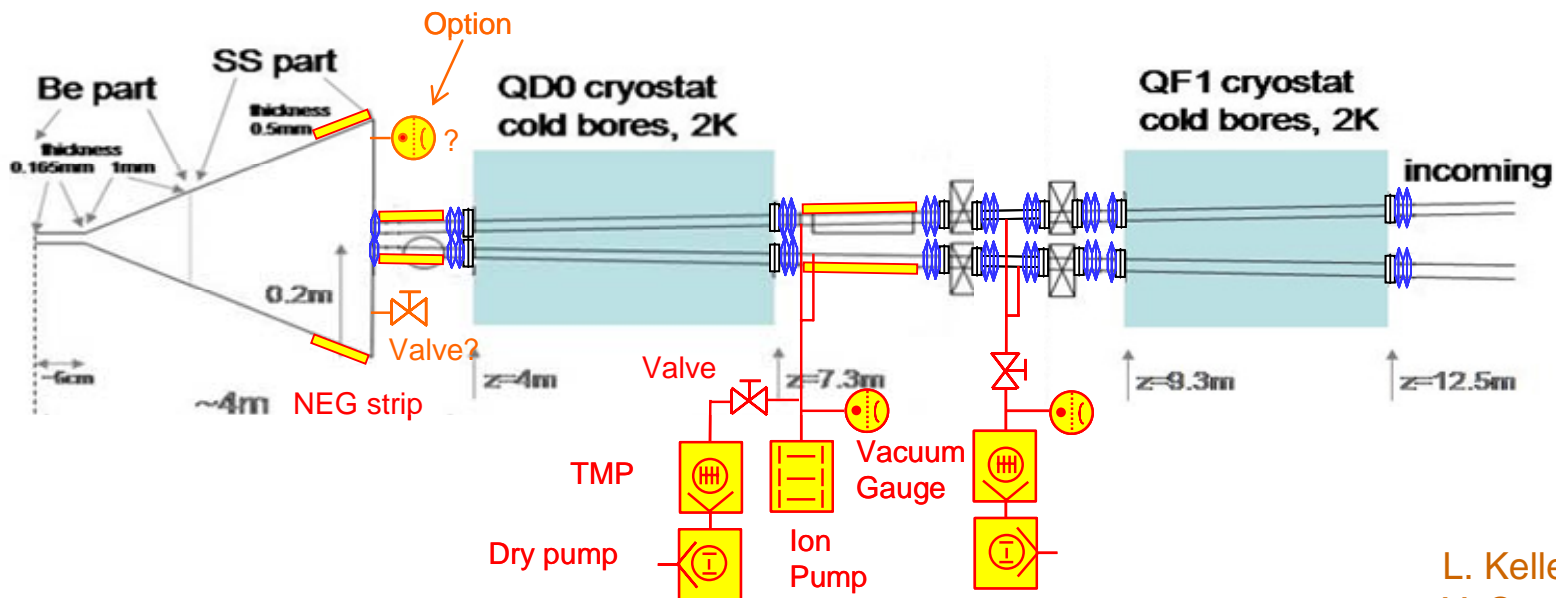
Henri Videau  
W. Lohmann

- Final Doublet (QD0)
  - Integrated in detector ( $L^* 4,5m$ )
  - Integrate anti-solenoid
  - Need to be fine adjusted
  - Constraints on cryo supply



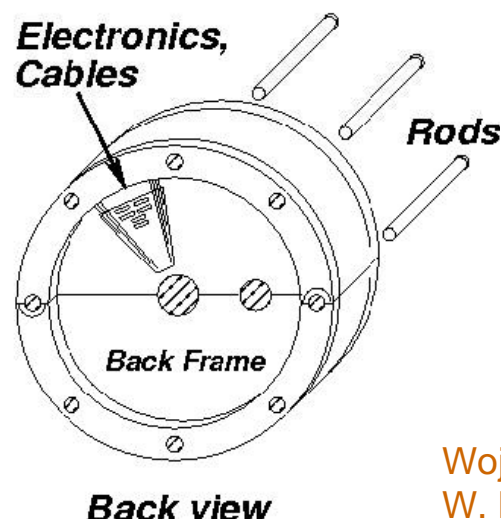
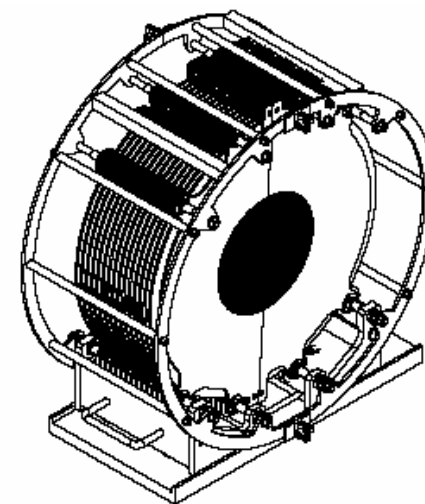
BRETT Parker  
Andy Marone

- Vacuum in beam pipe
  - Several configurations depending on MDI requirements
  - First layout



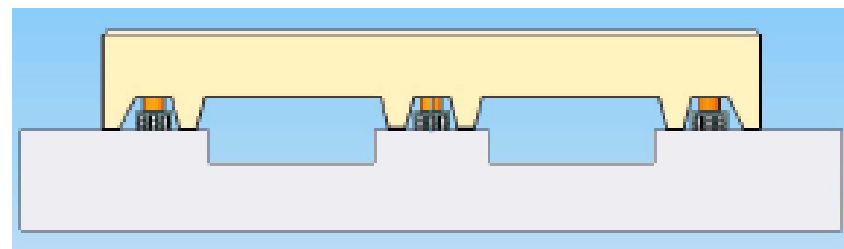
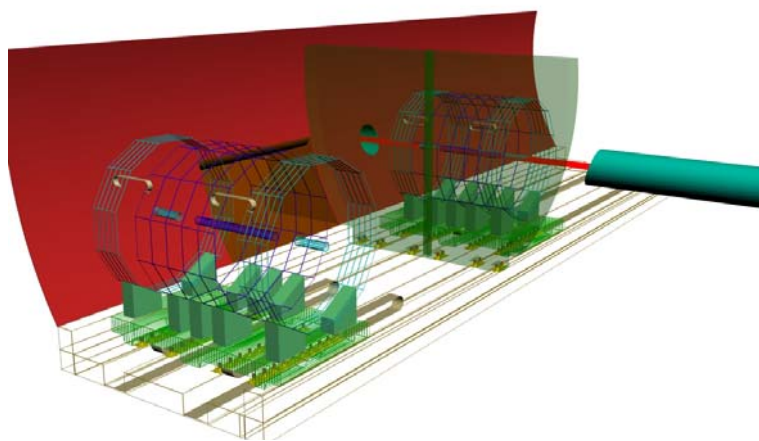
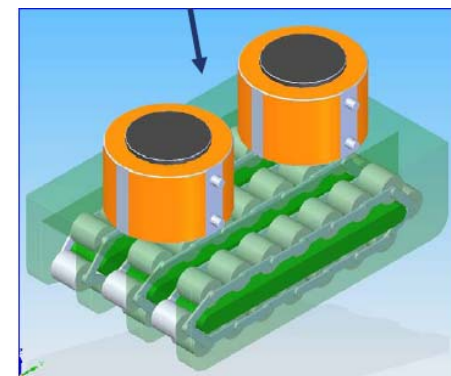
L. Keller  
Y. Suetsugu  
O. Malyshev

- **LumiCal**
  - **30 W/Si layers (250Kg)**
  - **Alignment :**
    - Distance / beam <  $\sim 700 \mu\text{m}$
    - Distance / Calorimeters <  $\sim 100 \mu\text{m}$ ,
    - tilts <  $\sim 10 \text{ mrad}$
  - **Centered on outgoing beam**
- **BeamCal**
  - **Si/W layers (200Kg)**
  - **Centered on outgoing beam**



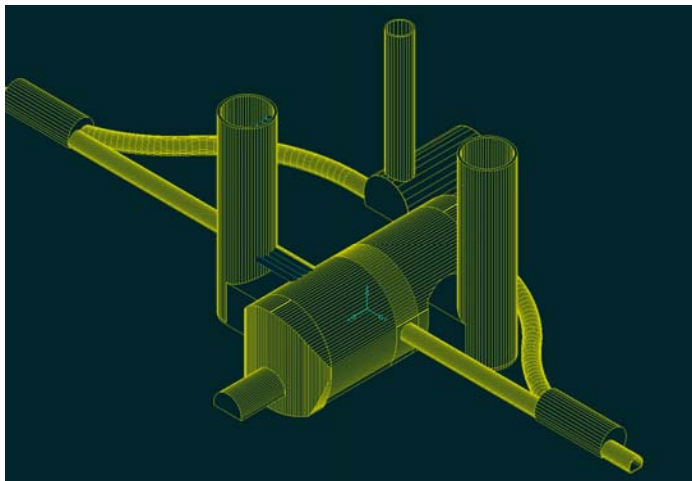
Wojciech Wierba  
W. Lohmann

- Concept :
  - 1 IR for 2 detectors
- Solutions :
  - Detector moving itself
  - Platform with Hillman rollers



John W. Amann  
Andrea Gaddi

- Chosen design :
  - 2 big shafts
  - Transfert tunnels
  - Gantry crane (2000t) on surface for assembly a la CMS
  - 2 x100t crane in cavern
  - Shielding wall



Alain HERVE  
Hubert GERWIG

- Several interfaces had been defined
  - **Services** (interface document written)
  - **IR Hall design**
  - **Cranes capacity**
- Lots of engineering studies are needed for EDR in 2010 :
  - **Push–Pull issues**
  - **IR Hall design** (civil engineering)
  - **Detector integration**
    - Final Doublet (QD0)
    - Beam pipe design and pumping (need MDI information)
    - Opening scenario (on beam line/garage position)
    - End Cap design
    - Heavy lifting (helped by CMS Team)
    - Etc...