

# First thoughts about CO<sub>2</sub> cooled BPIX mechanics

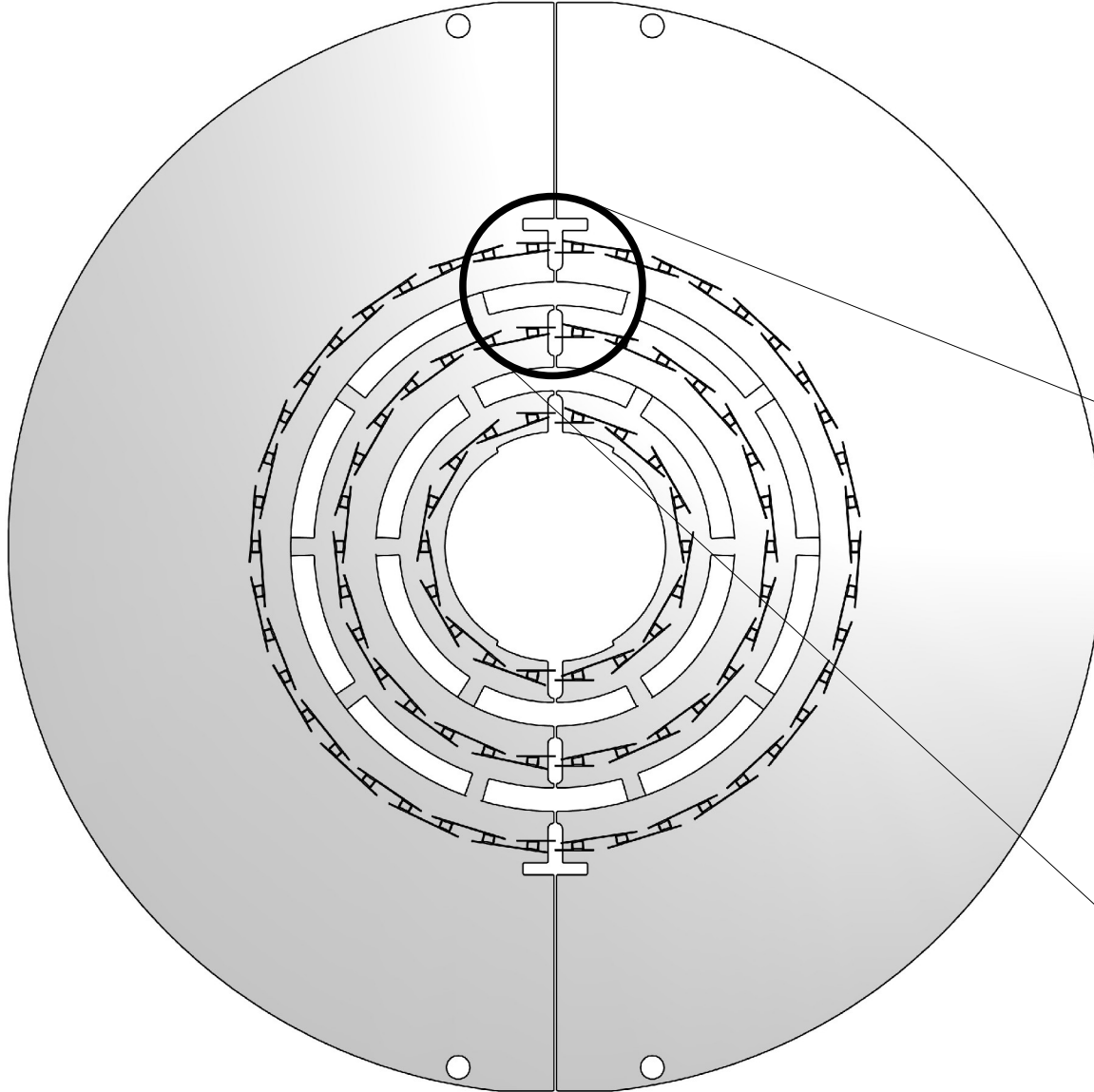
Silvan Streuli, PSI

2013 Pixel Replacement/Upgrade

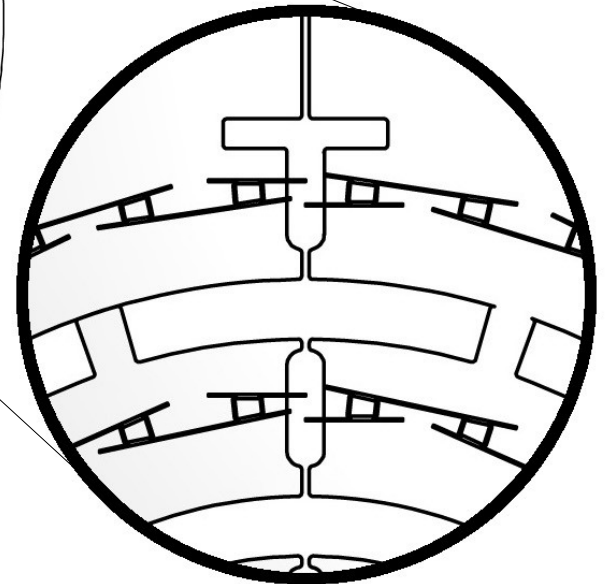
Discussion Meeting

9.10.2008

# Current BPIX Mechanics



- Two identical half shells
- 1 type of fullmodule
- 2 types of halfmodules
- At least 100 different cablelengths

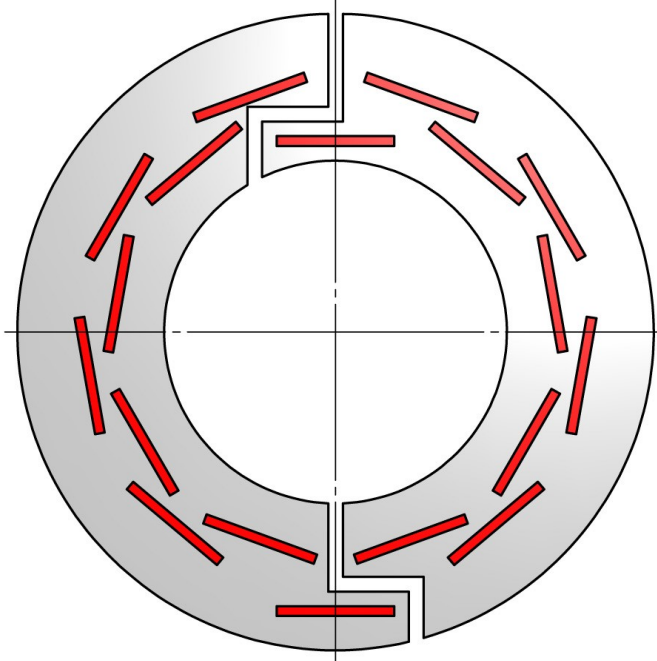


# Wishlist BPIX mechanics for 2013

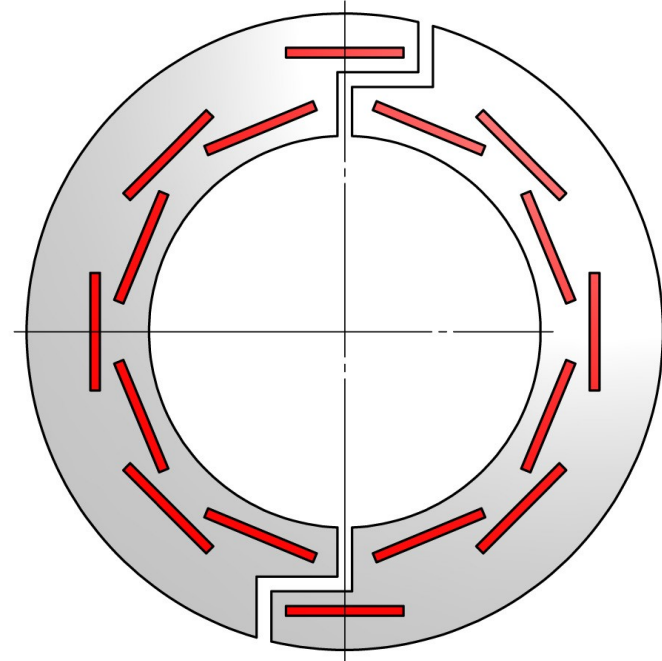
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- Only one type of modules
- Simpler mechanics
- Two identical half shells
- All modules with same cablelength
- More clearance between half shells
- Layer 1 closer to beampipe (44mm → 39mm)
- BPIX wheels adjustable in X and Y ( $\pm 3\text{mm}$ )
  - adapt to real situation
  - safer tolerances
- CO<sub>2</sub> cooling
- ....

# Possible number of faces (example layer 1)

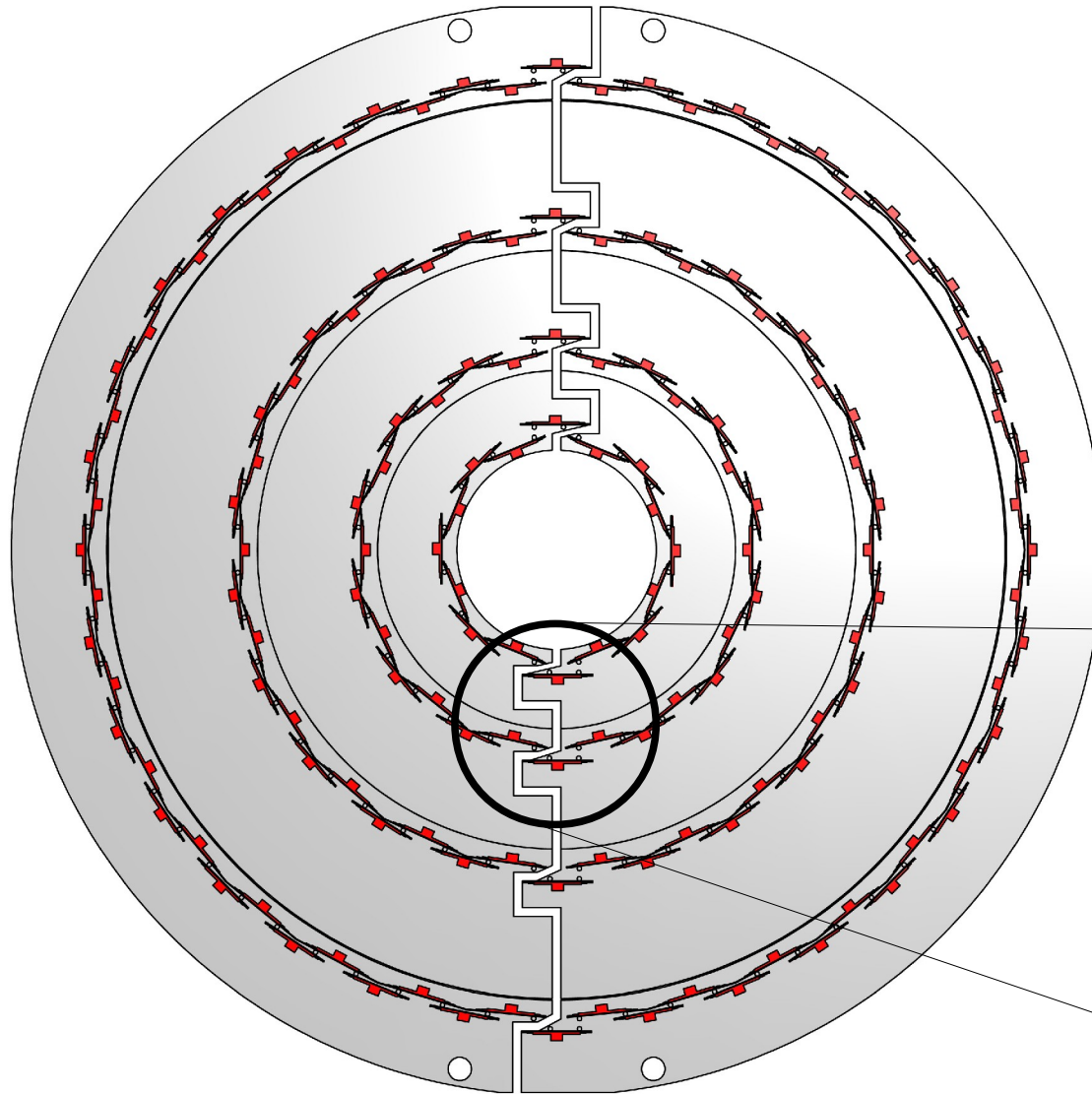


- **18 faces** (the current BPIX layer 1)
- **Top face displaced inwards**
- **Bottom face displaced outwards**
- **Half shells are not equal**
- This design requires:  
**# faces = even number**

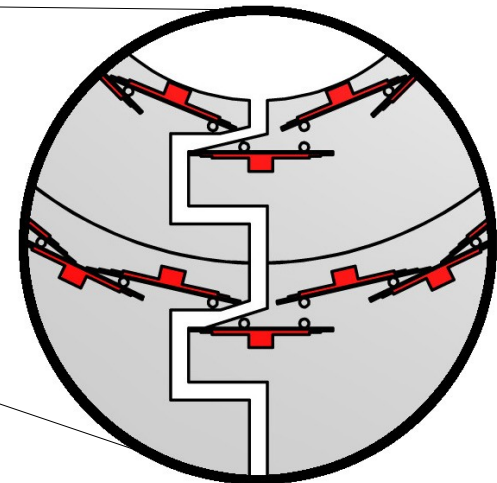


- **16 faces** (BPIX Layer 1, 2013)
- **Top & bottom faces displaced outwards**
- **Half shells are equal**
- This design requires:  
**# faces = multiple of 4**

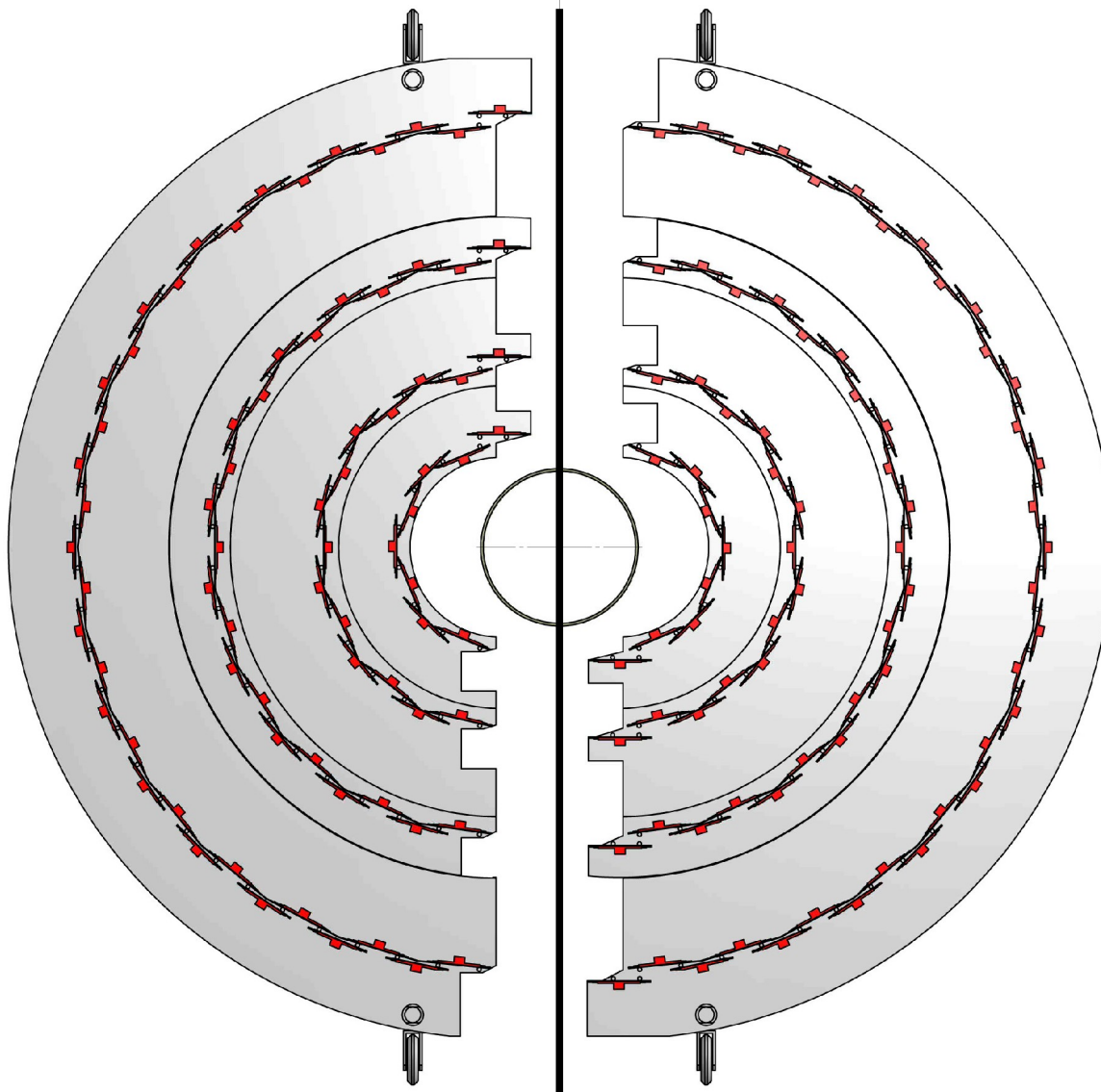
# New BPIX layout for 2013 (proposal)



- Two identical half shells
- 1 type of fullmodule only
- Layer 1: R 39mm; 16 faces
- Layer 2: R 68mm; 28 faces
- Layer 3: R 109mm; 44 faces
- Layer 4: R 160mm; 64 faces
- Clearance to beampipe 4mm



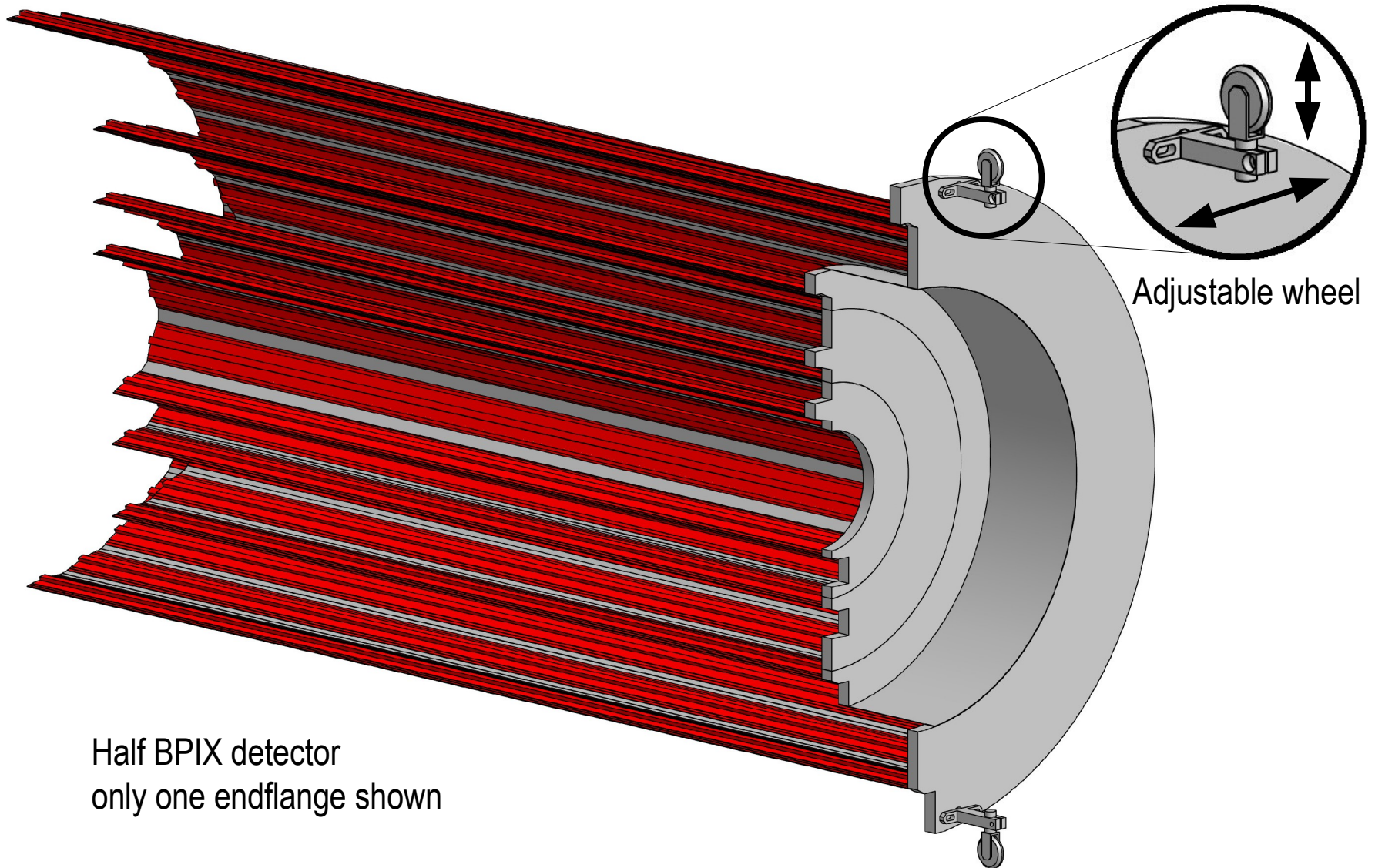
# Clearance to beampipe support



## During Insertion:

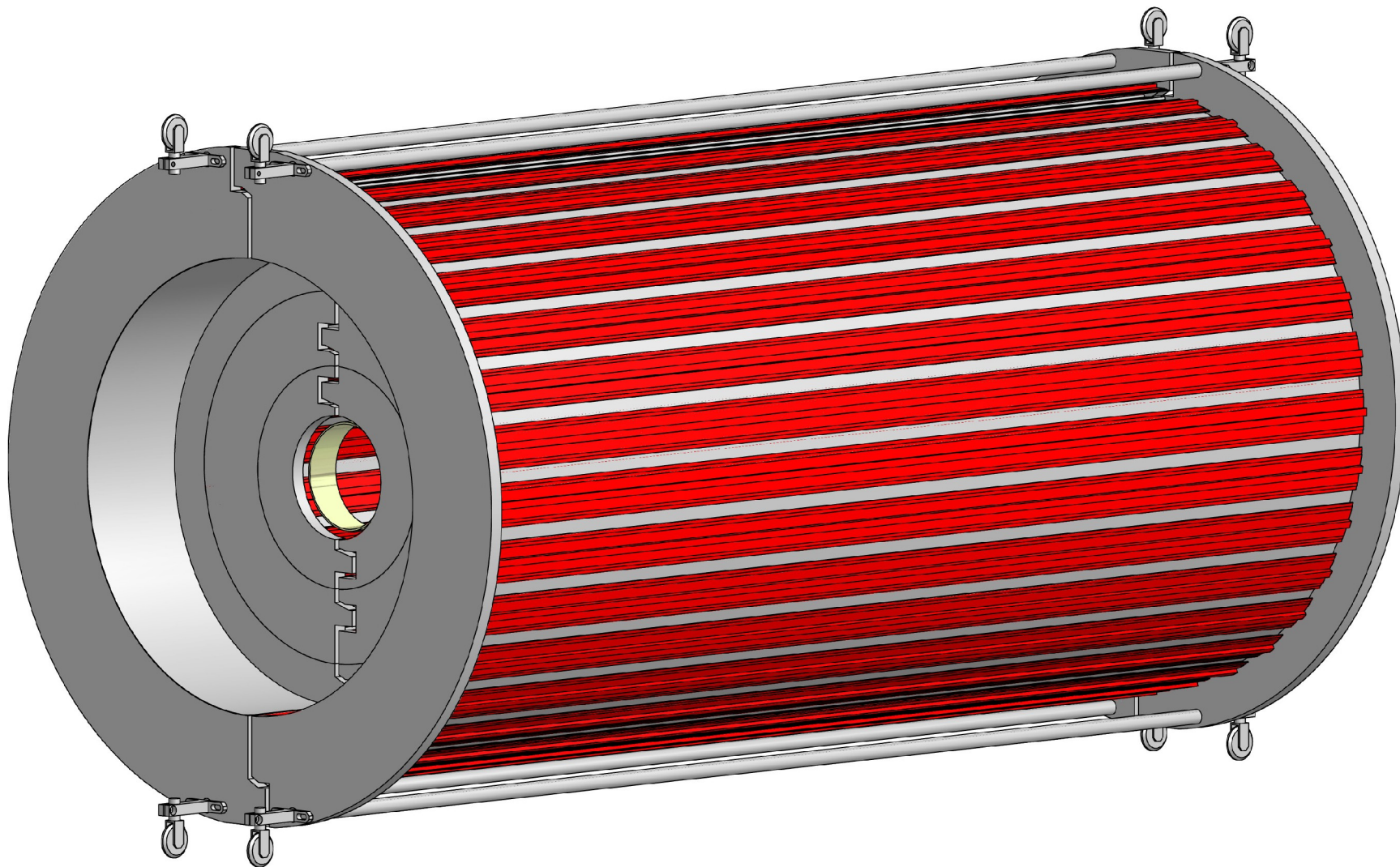
- Minimum clearance between BPIX 2013 and beampipe support (Z-position 1635mm) is 10.5mm.

# 3D view BPIX halfshell mechanics 2013



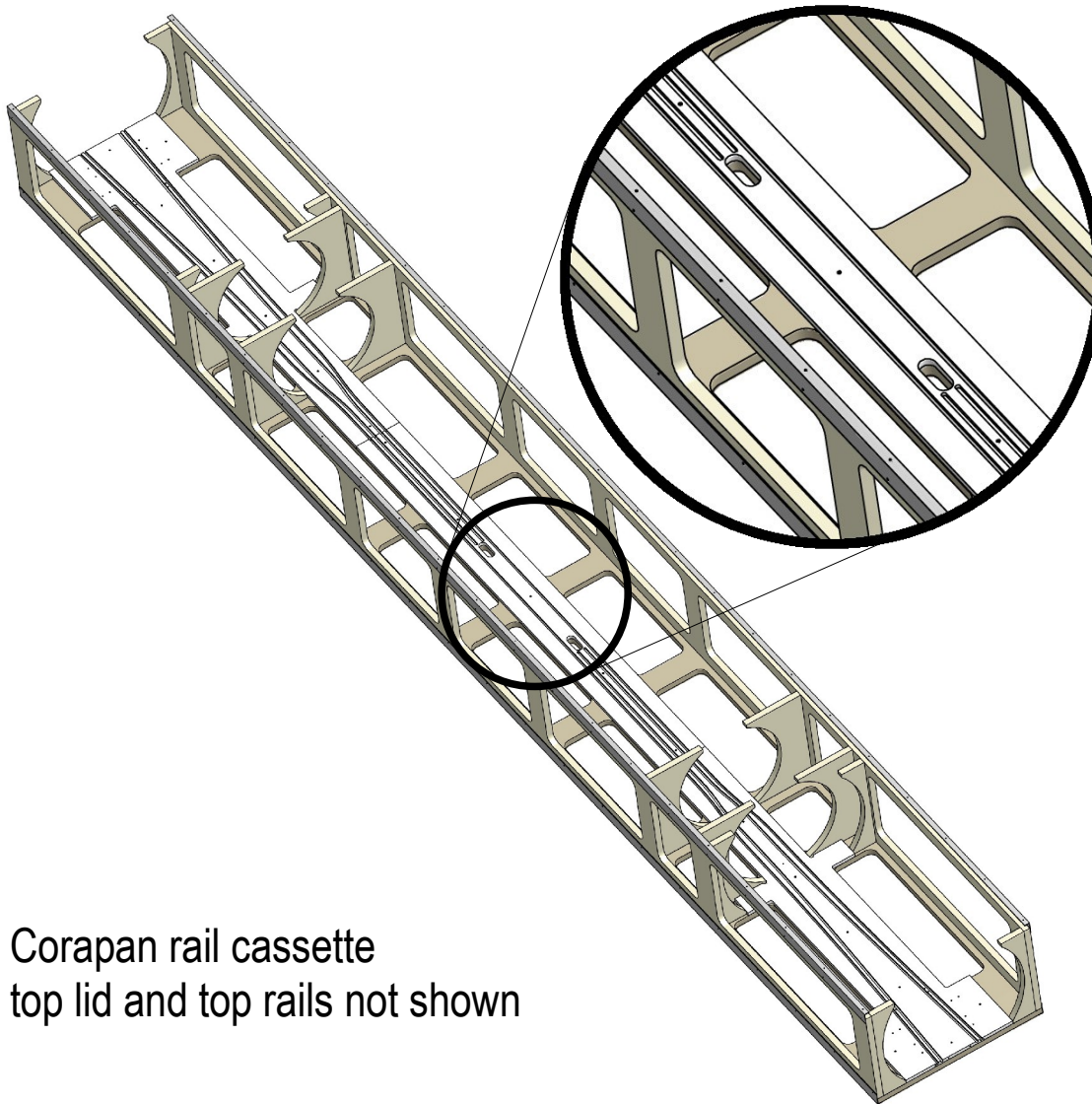
Half BPIX detector  
only one endflange shown

# 3D view BPIX full detector mechanics 2013





# Cassette with rails for pixel-insertion tests

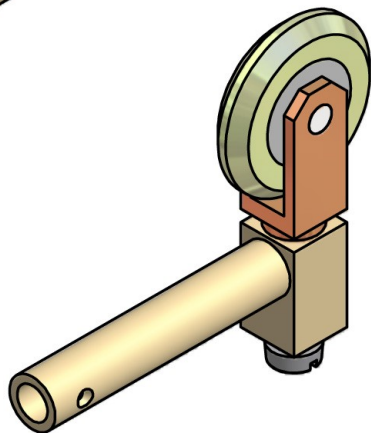
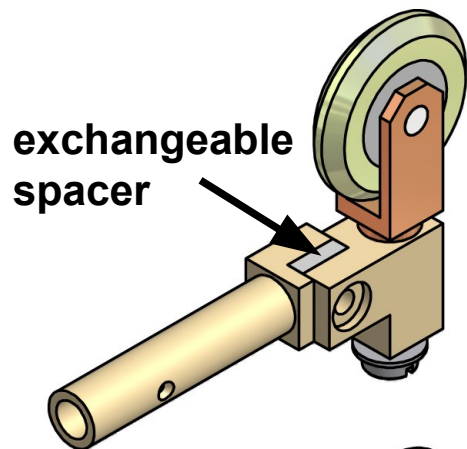


Corapan rail cassette  
top lid and top rails not shown

- Rails for FPIX / BPIX
- Ribs to emulate TIB & bulkhead inner envelope
- Cassette made out of Corapan (aluminium-styrofoam sandwich)
- Rails milled out of 15mm PVC plates
- Better studies for further pixel detector installation.

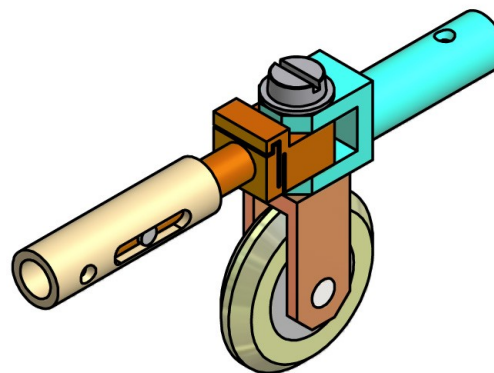
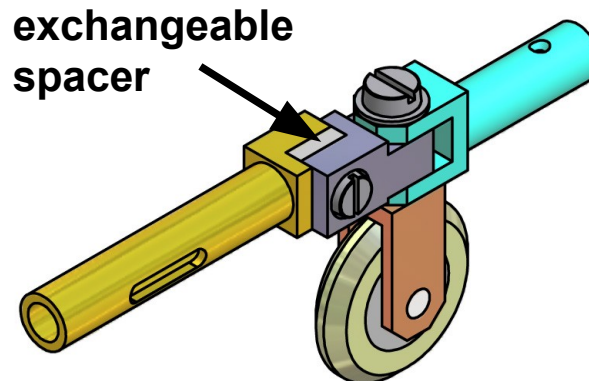
# New wheelset for next shutdown

New detector top wheel



Old detector top wheel

New detector bottom wheel



Old detector bottom wheel

# Summary

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- New BPIX layout with only one type of sensormodule requires:  
# faces = multiple of 4
- Future BPIX wheelsets adjustable → adapt to real beampipe position
- Building a plastik BPIX model of the 2013 design. Test insertion during one of the next shutdown periodes. (3D stereo lithographic prototype)
- Cassette with rails for pixel-insertion tests.  
(design completed → fabrication soon)
- During next shutdown periode → replacing the current wheelsets with adjustable wheelsets.