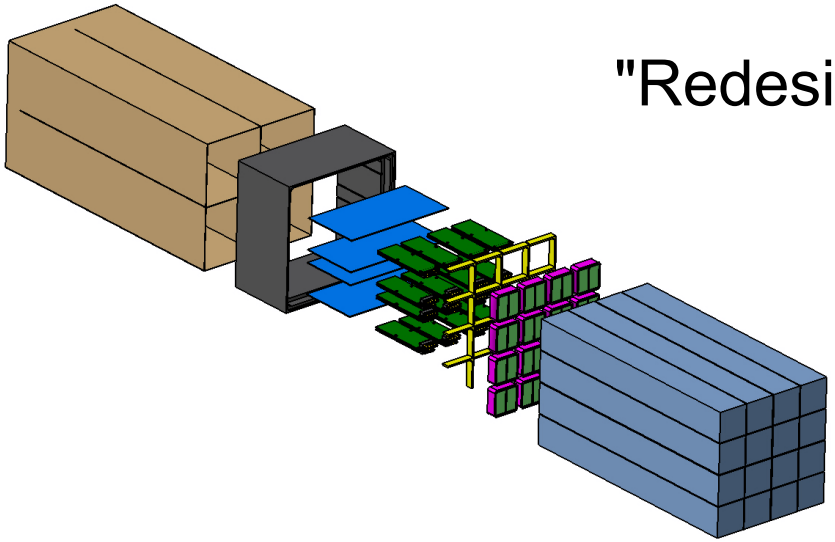
Group Meeting
Backward Endcap of the EMC



"Redesign of Subunits of the EMC BW"

Gustavo Tejerina Álvarez – GSI Darmstadt

24th September 2010

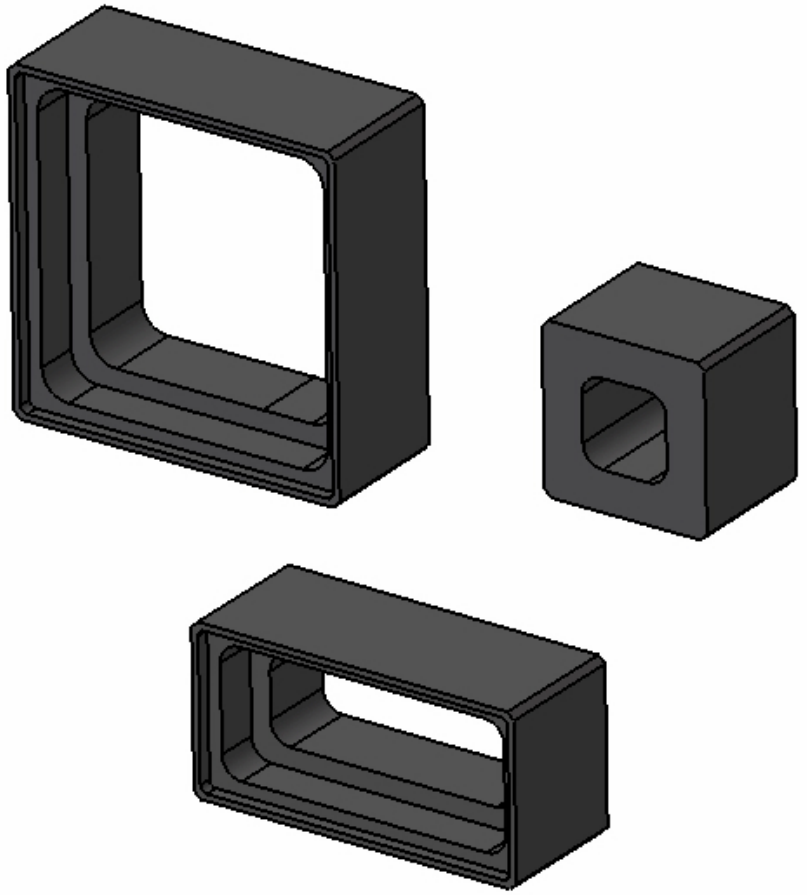
EMC BACKWARD ENDCAP

- New Inserts: Redesign and Analysis
- New Alveoles: Redesign
- Assembly of New Subunits
- Mounting Plate
- Proto60: Preamplifiers
- Summary

EMC BACKWARD ENDCAP

Old Inserts

- Only three different types (1; 2 and 4 crystals)
- 164 inserts needed
- 4 threaded holes per insert

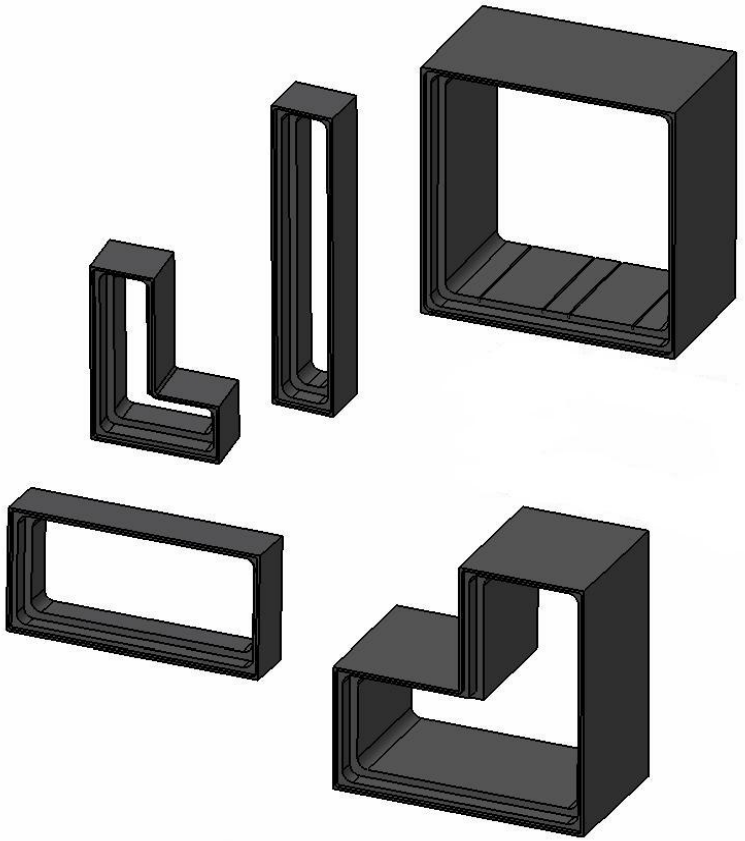


New Inserts

Redesigned with the aim to reduce number of threaded holes in the Mounting Plate

- Five new types:

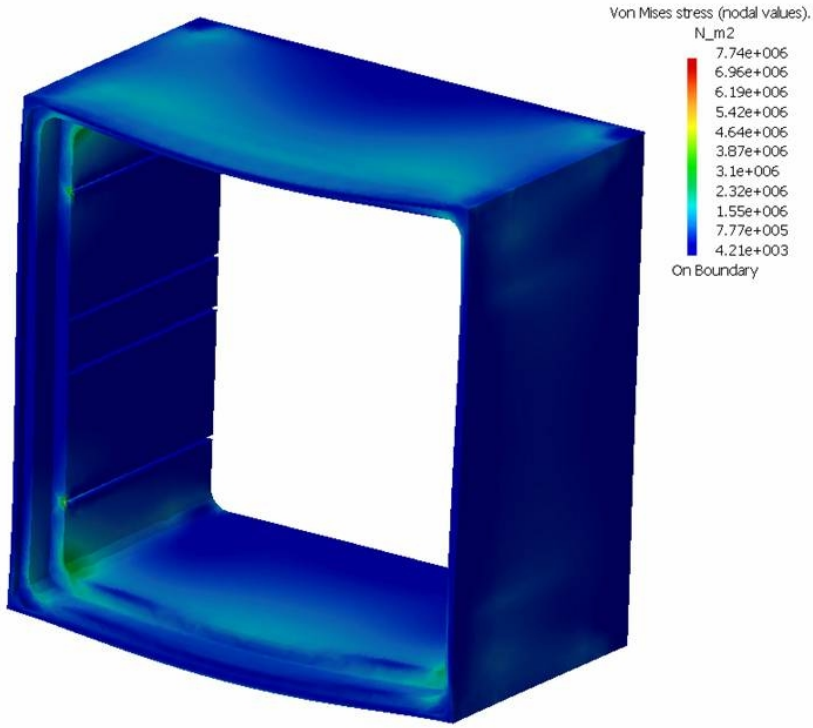
  4; 5; 8; 12; 16 Crystals
- 68 inserts needed
- Four threaded holes per insert



EMC BACKWARD ENDCAP

Stress Analysis

- Trickiest inserts: The ones with 16 and 5 crystals
- Material: Aluminium Alloy
- Yield Strenght: 95 MPa
- Safety Factor >10



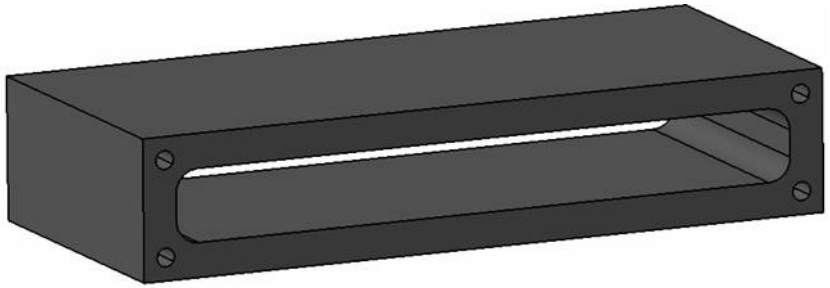
16 Crystals Insert

Max Stress: 7.74 MPa < Yield Strength: 95 MPa

Permanent Deformation will not occur

EMC BACKWARD ENDCAP

Stress Analysis



- Material: Aluminium Alloy
- Yield Strenght: 95 MPa
- Safety Factor: 6

5 Crystals Insert

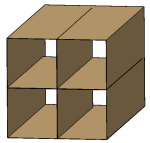
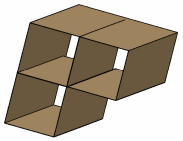
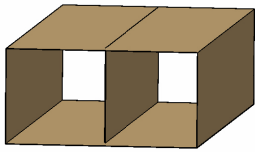
Max Stress: 14.8 MPa < Yield Strength: 95 MPa

Permanent Deformation will not occur → No more holes are needed

EMC BACKWARD ENDCAP

New Alveoles

- Redesigned with the aim to meet the needs of the new inserts
- Every group of 4 crystals has an internal wall with a thickness of 0.4 mm (double than the external wall).
- Length of all alveoles was also modified to 220.2 mm

Crystals	Picture
16	
12	
8	
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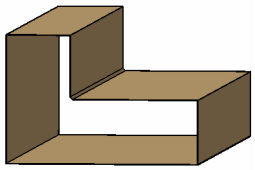
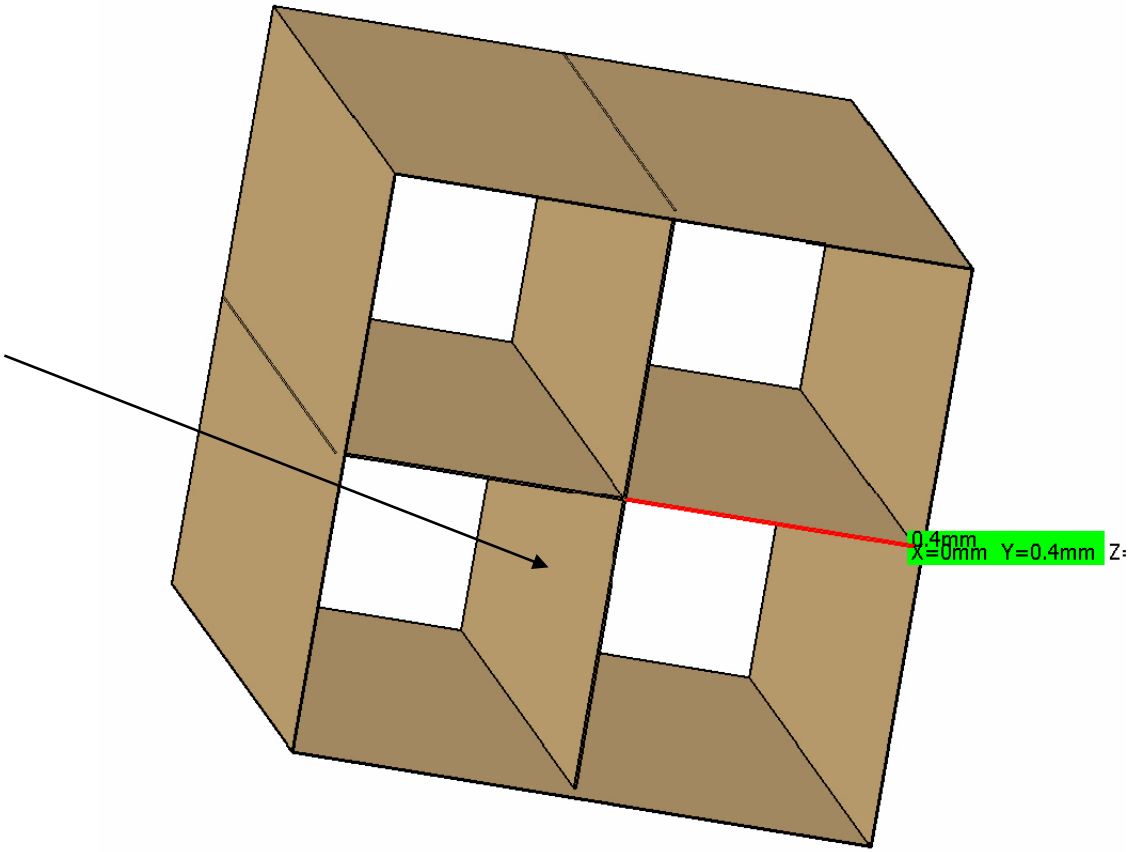
4	

New Alveoles (II)

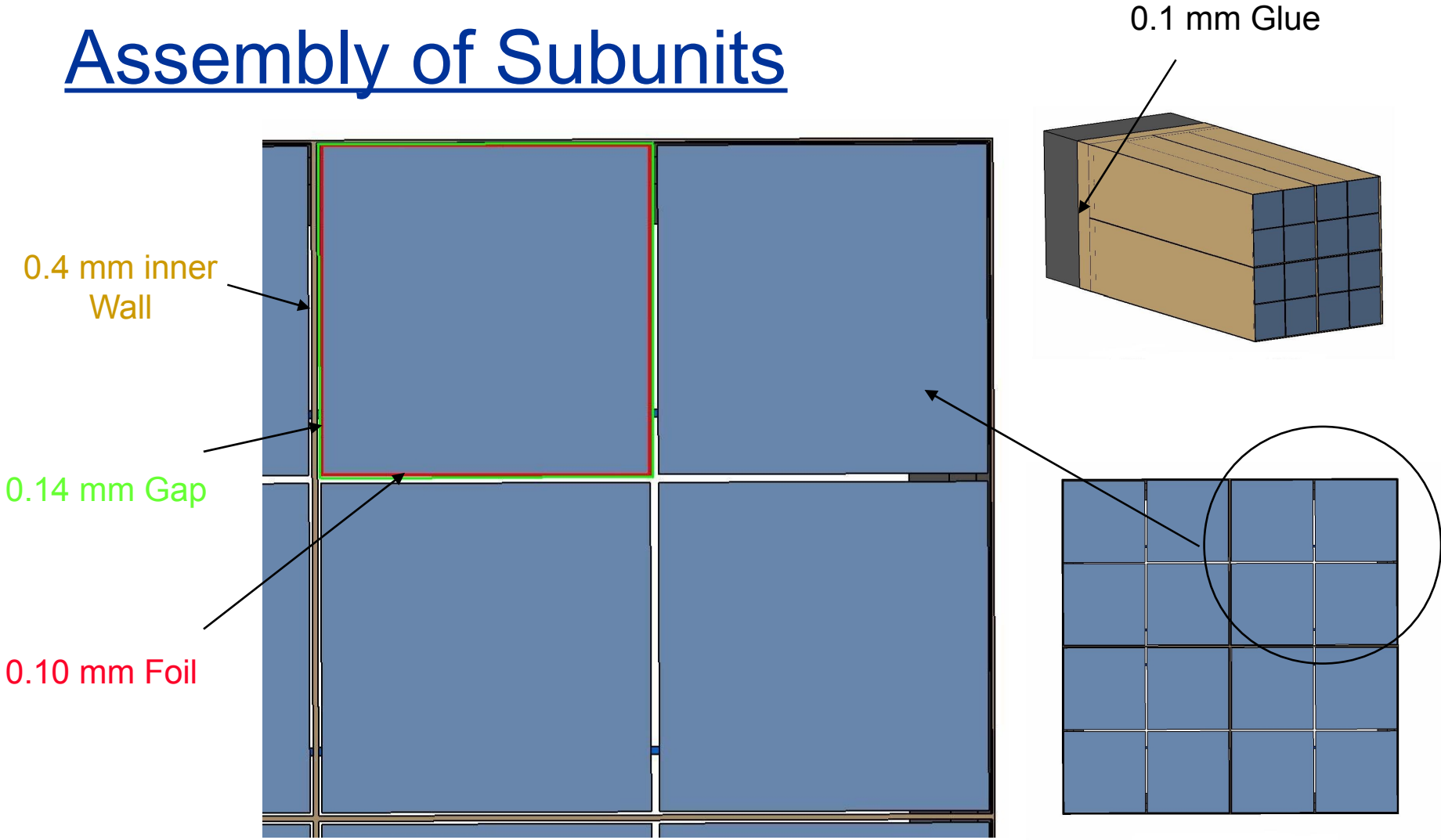
New Inner Wall of 0.4 mm



Snapshot of O:\gsi\tejerina\Alveoles\New Ones\Alveole 16C.CATPart - 06/09/2010 17:07:54

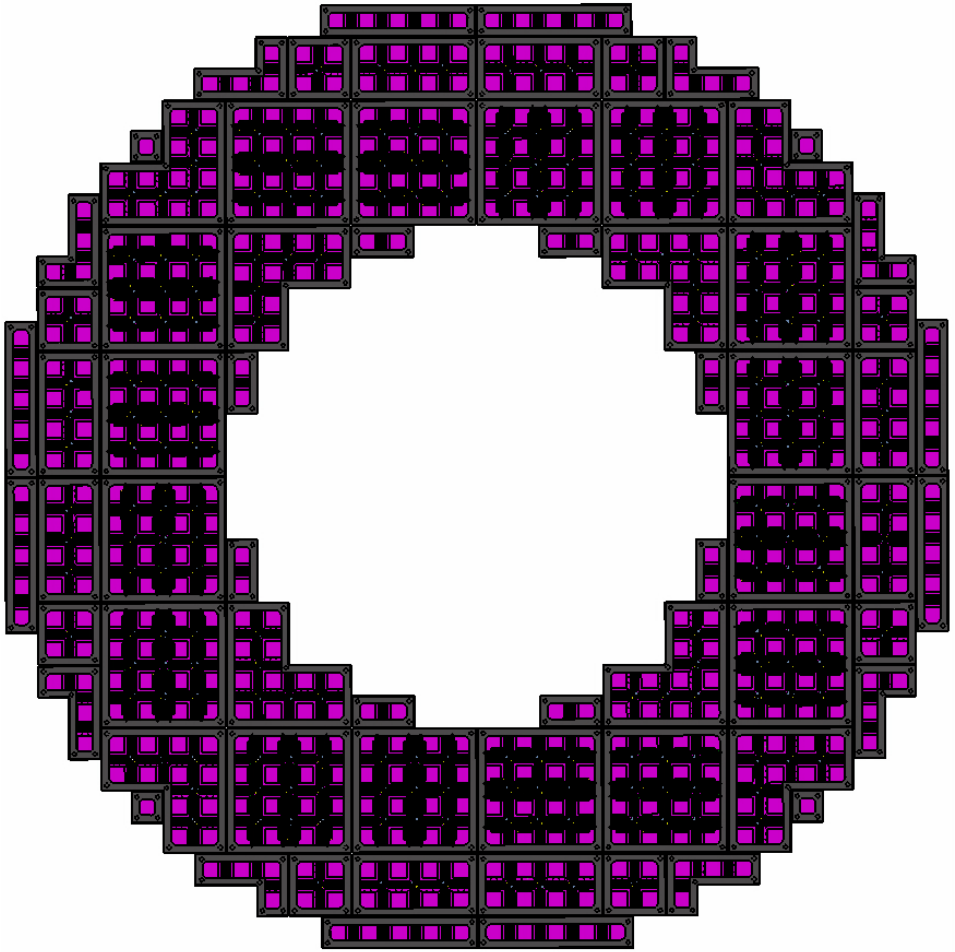
EMC BACKWARD ENDCAP

Assembly of Subunits



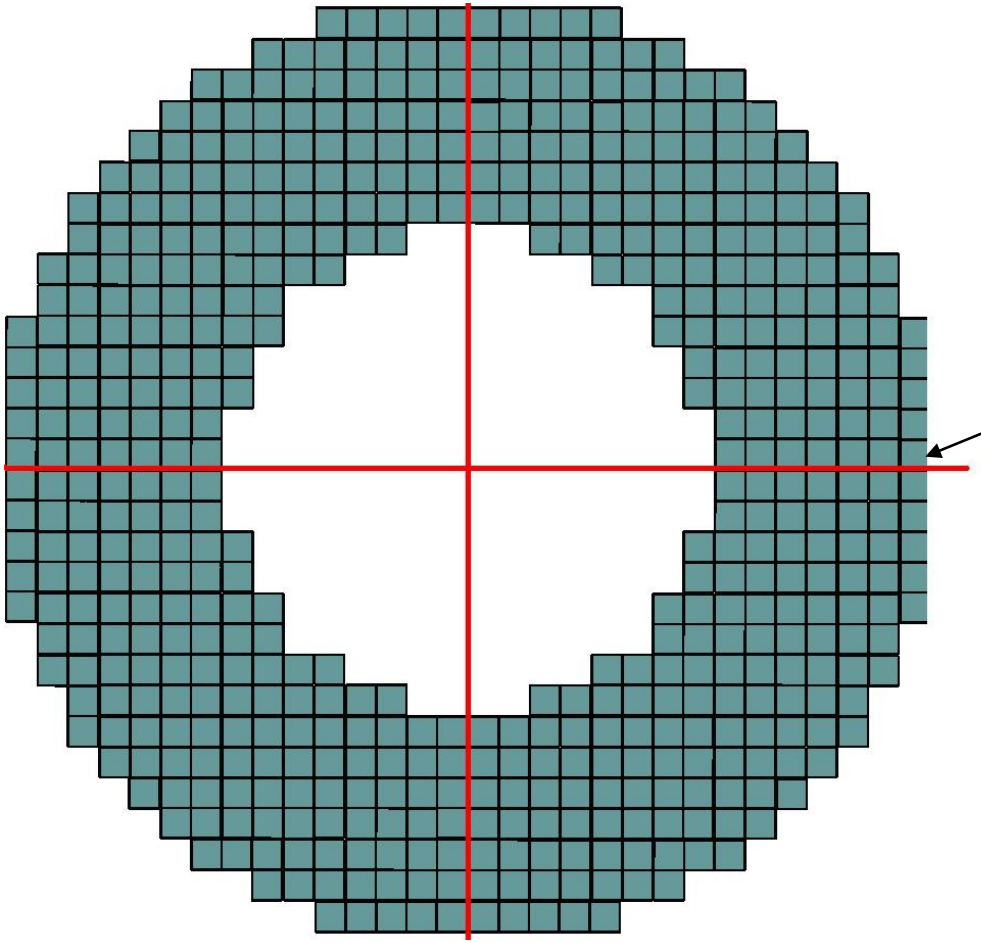
EMC BACKWARD ENDCAP

Full Assembly of Subunits



0.75 mm Gap between subunits

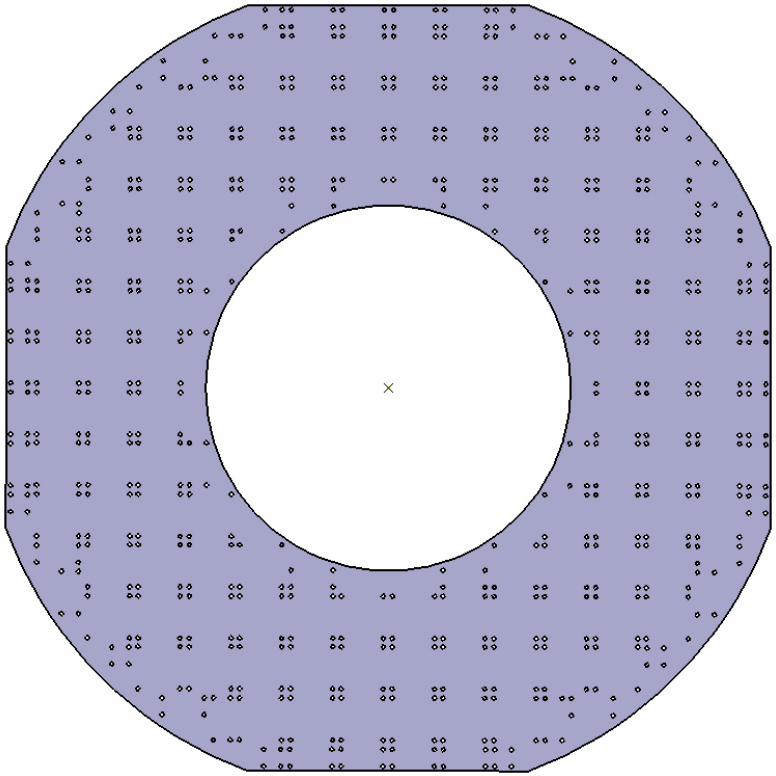
Full Assembly of Subunits

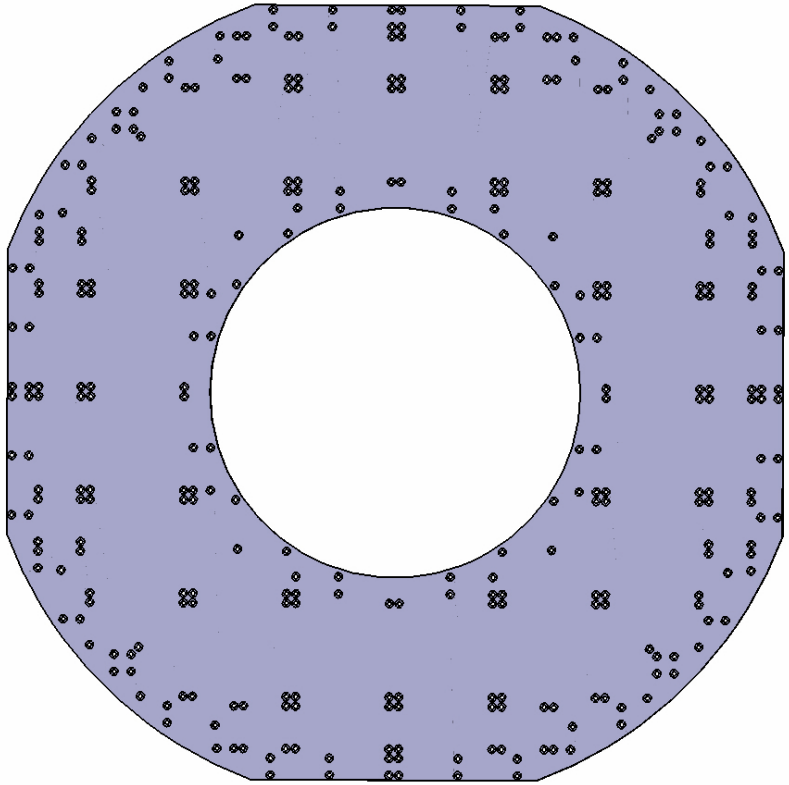


0.8 mm Gap in the Principal Cross

EMC BACKWARD ENDCAP

Mounting Plate





Old version: 656 Holes

50% less of holes

New version: 312 Holes

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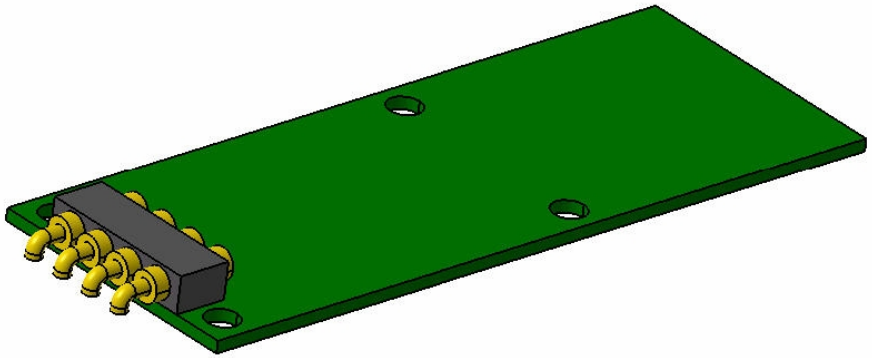
Preamplifiers



- One preamplifier per APD
- 2 APD per Crystal

↓

- 16 Crystals Inserts: 32 preamplifiers

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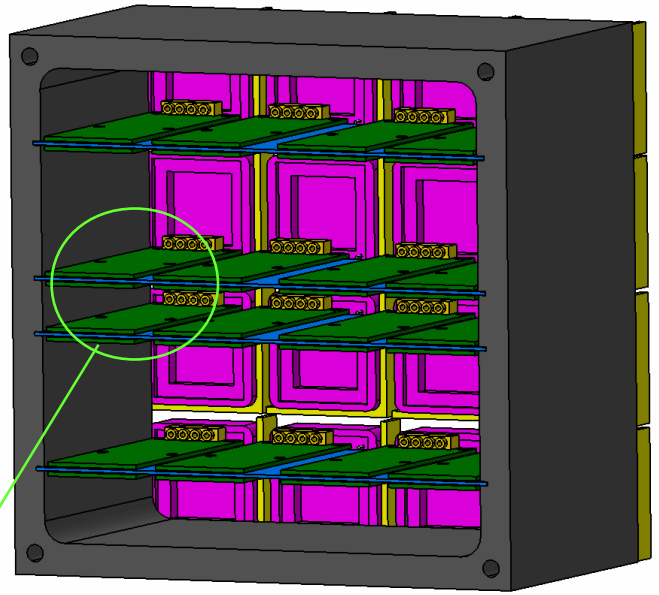
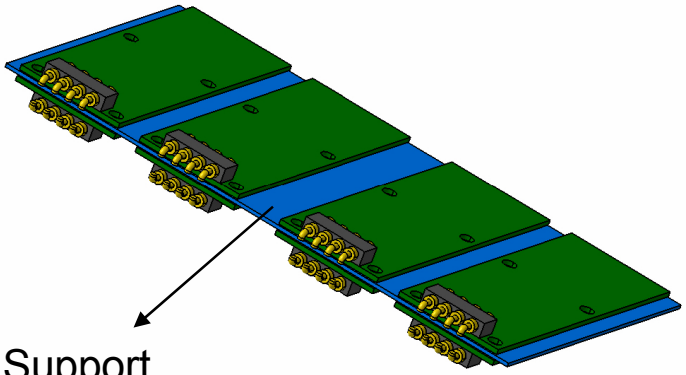
Problem: How to place them in the subunits?

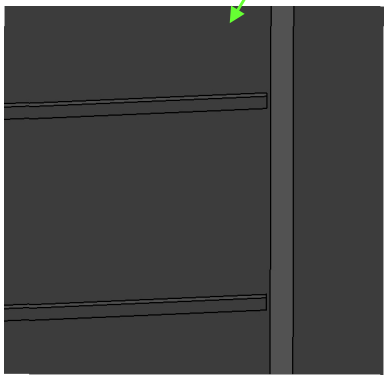
Preamplifiers: Assembly

- Preamplifiers will be screw into a support
- Modifications in the inserts to place them
- 4 slots to host the supports
- Easy to (dis)assemble
- Easy to connect preamplifiers to the APDs





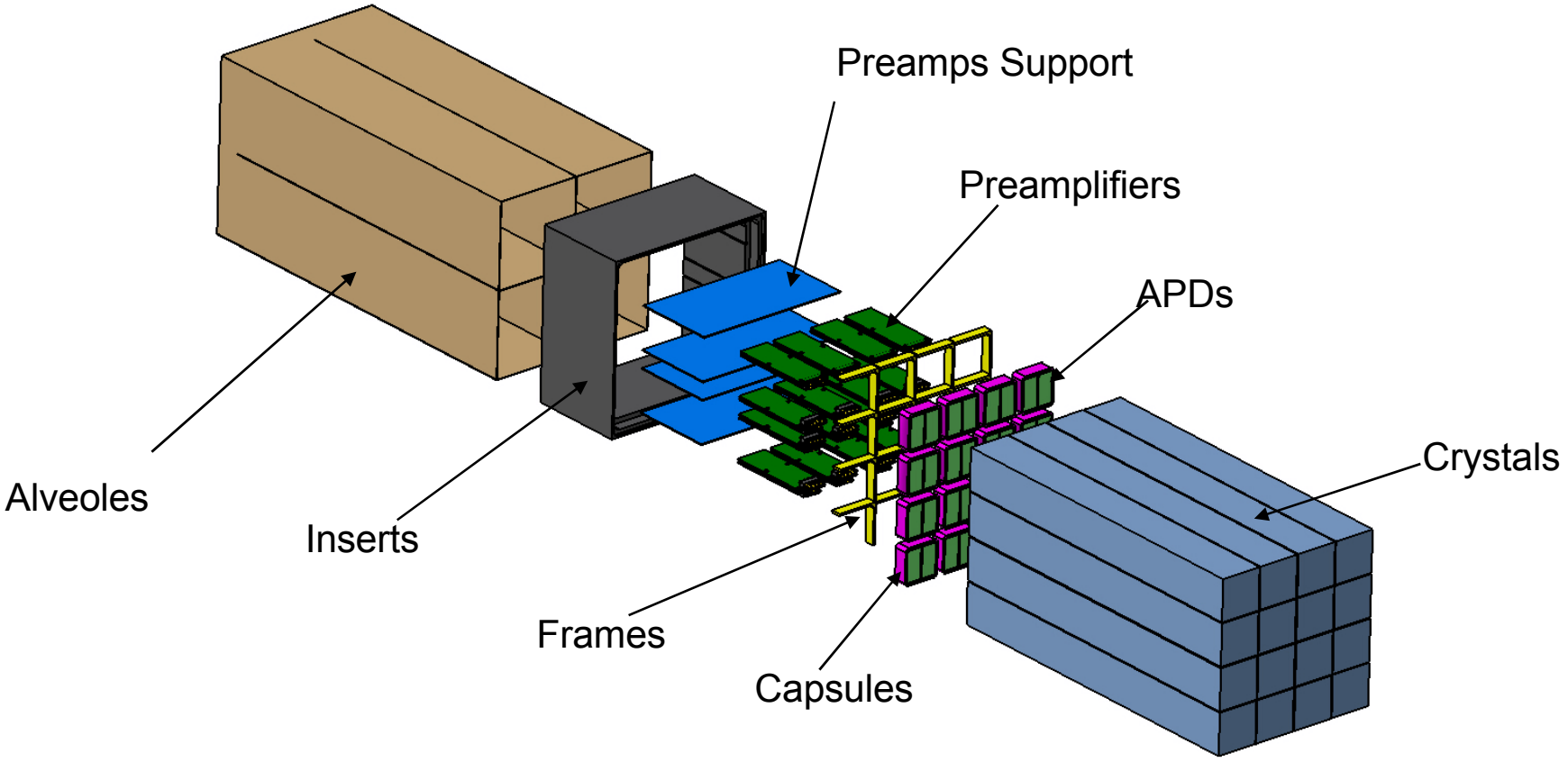
Support



Stopper

Assembly for the Proto60

Preamplifiers: Assembly



Exploted View

Summary

- The new inserts drastically reduce the amount of threaded holes in the MP
- The trickiest inserts can sustain the load
- New Full Assembly of subunits done
- The new inserts can also host the preamplifiers (Proto60)

THANK YOU FOR YOUR ATTENTION

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24th September 2010