

Discussion

Common Modules

(almost the same slides as last year
- and the year before)

DESY, 1.12.2017

New Modules



Most groups have taken the final data with the current modules and are preparing a publication.

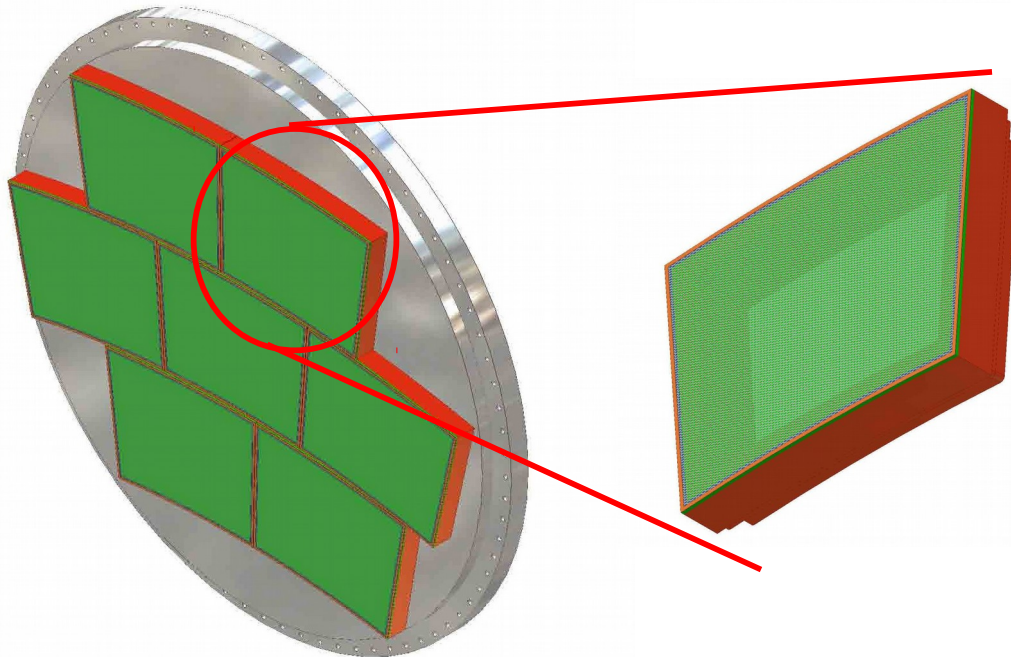
This is why we should ask the question of what to do now.

The main question is what we want to implement in common:

- certainly backframes
- Gating grids
- S-ALTRO16
- Common padplane (again ;-))

Can we unite the two GEM modules? The ECFA Detector R&D panel charged us to do so.

Currently: Common Modules sizes



Modules have size of $22 \times 17 \text{ cm}^2$

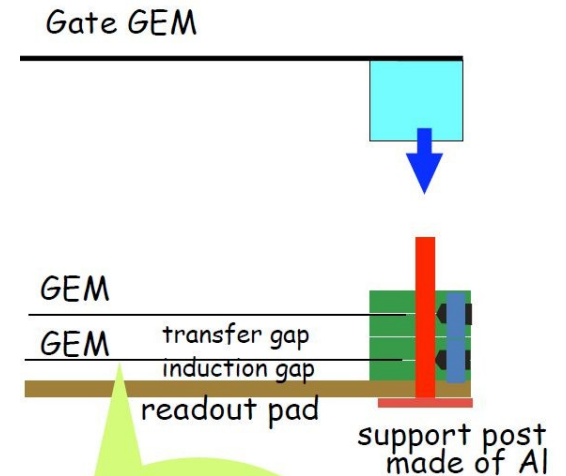
We should use the light weight design from now on.

The fit also in the old endplate, mounting brackets are available, also the mounting tools works

Gating device



- Shall we foresee a gating device? I think yes.
- How many HV connections? 2?
- What distance from amplification stage?
- Do we need a field degrader?
- How much space do we need at the border?
- What material should the spacer be made of?



Can the Japanese provide a larger number of gates (~10)?

Should we develop a wire based gating grid for comparison reasons?

Common pad plane (I)



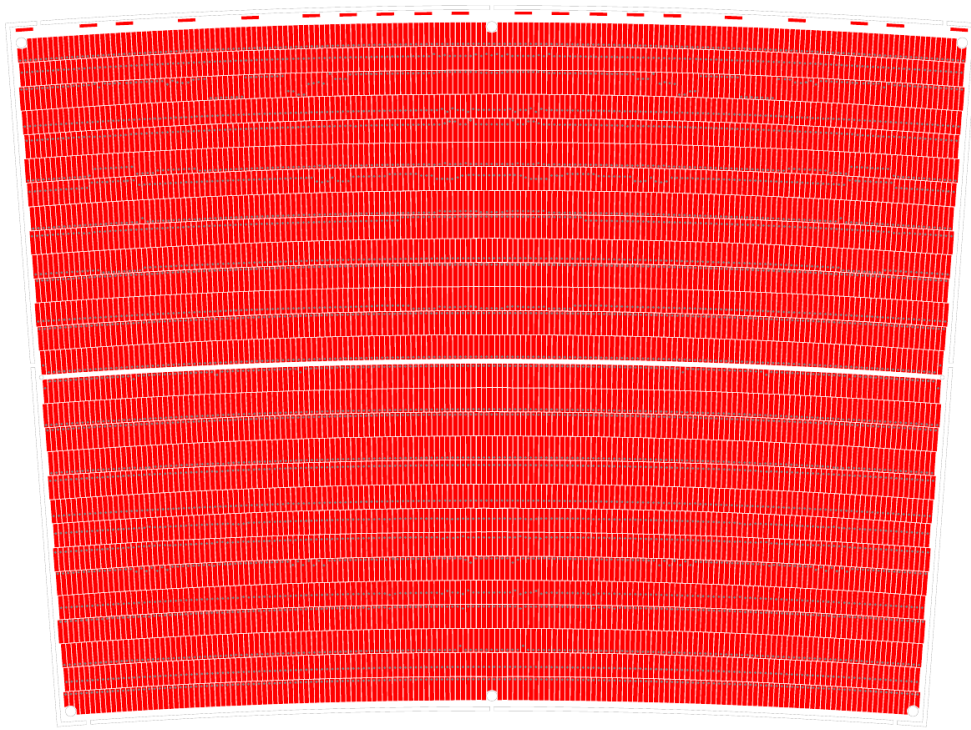
Common pad plane?

- Number of pads given by SALTRO-16: 3200 \Rightarrow $1.26 * 8.8 \text{ mm}^2$ staggered?
- We should decide what make most sense
 - full coverage = $1.26*8.8 \text{ mm}^2$ staggered?
 - cover only 1/2 of modules – left/middle/right with nominal pads $1*6 \text{ mm}^2$
 - What other possibilities?
- How do we deal with the different border space requirements of the different technologies?
- If we have a gating grid – what impact does this have on the module design.
 - Can we still have no frames on sides?
 - How many contacts do we need? 2?

Micromegas Module

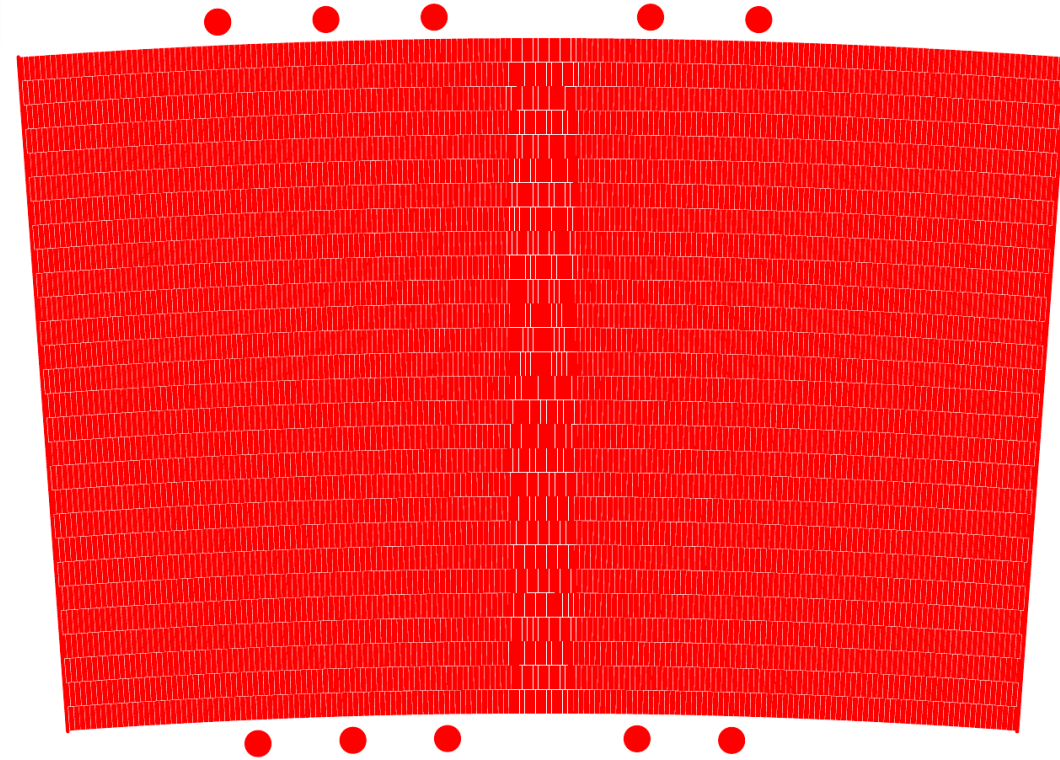
- $3 \times 7 \text{ mm}^2$ large pads, 24 row with 72 pads \rightarrow 1728 pads per module
- Grounding at border, 3 mm frames
- 1 HV contact in the center

Common pad plane(II)



DESY modules:

$1.26 \times 5.85\text{mm}^2$ pads - staggered
28 pad rows, 4829 channels per module
Thin frames – 1mm all around
20 HV connectors at top



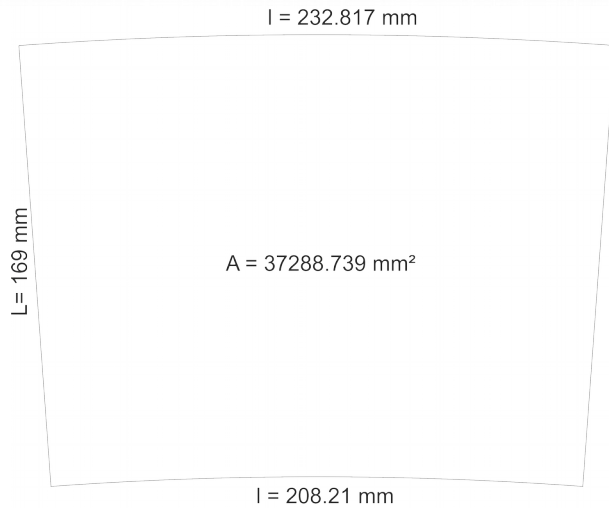
Asian module:

$1.2 \times 5.4\text{mm}^2$ pads - staggered
28 pad rows (176-192 pads/row)
5152 pads per module
1 cm wide frames at top/bottom
No frames at sides

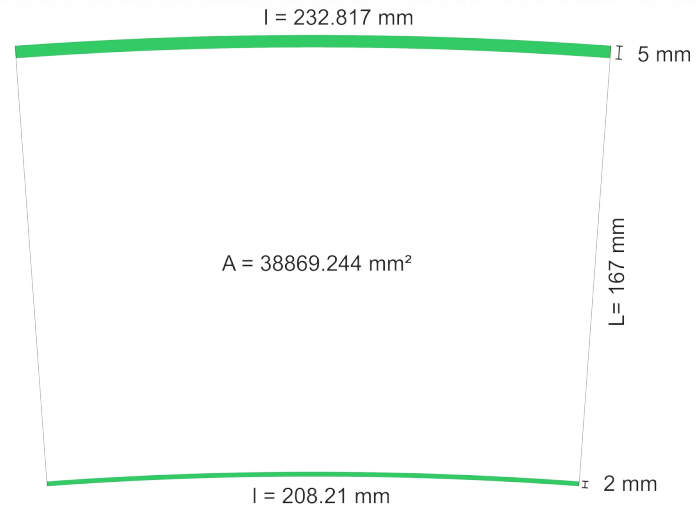
Common module (III)



module size

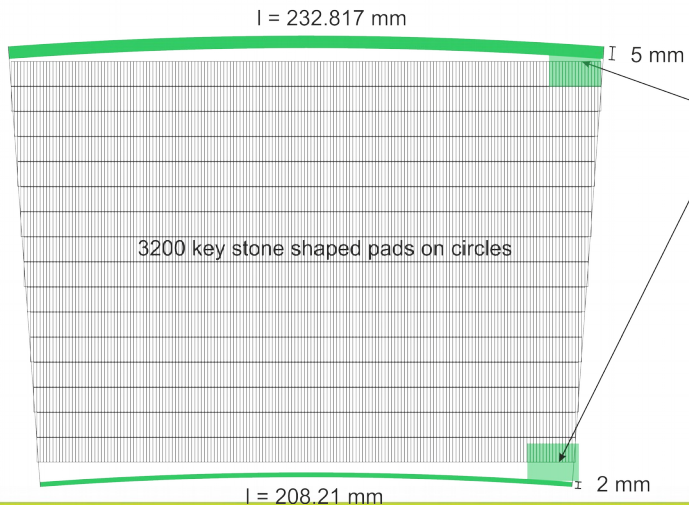


common inactive area



$$38869.244 \text{ mm}^2 / 3200 \text{ pads} = 12.15 \text{ mm}^2/\text{pad}$$

-> 1.26 mm * 9.6 mm pads

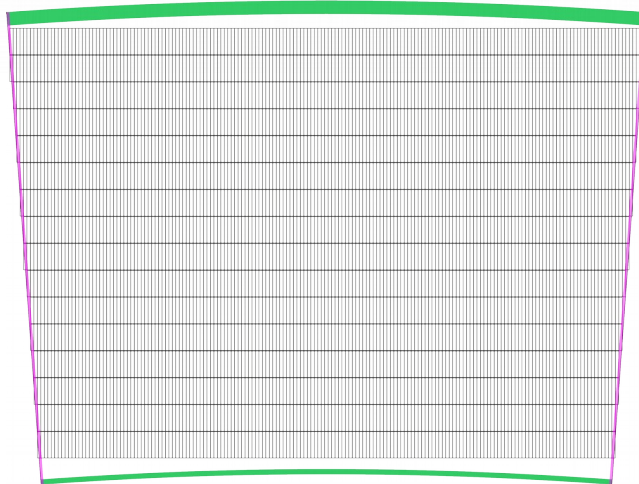


Define common areas for HV feet-through of gating device and field degrader?

Common module (IV)

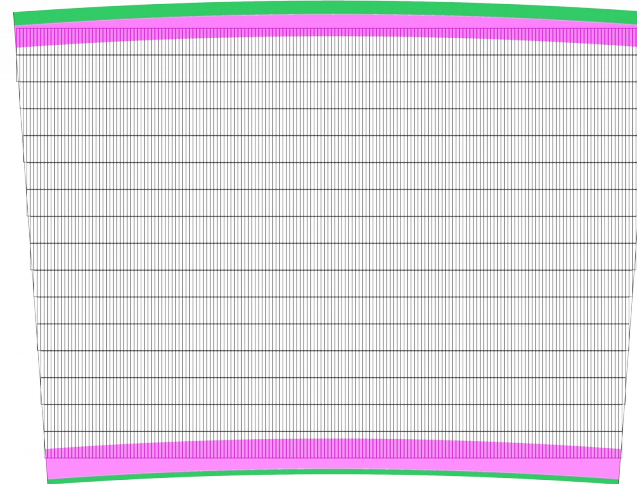


DESY - GEM (border 1mm at sides)



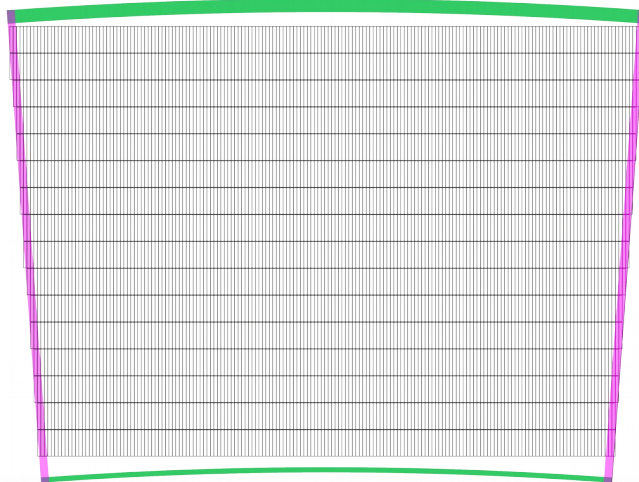
loss of 28 pads

Asian- GEM (border 13 mm top and bottom)



loss of 250 pads

Micromegas (border of 3mm everywhere)



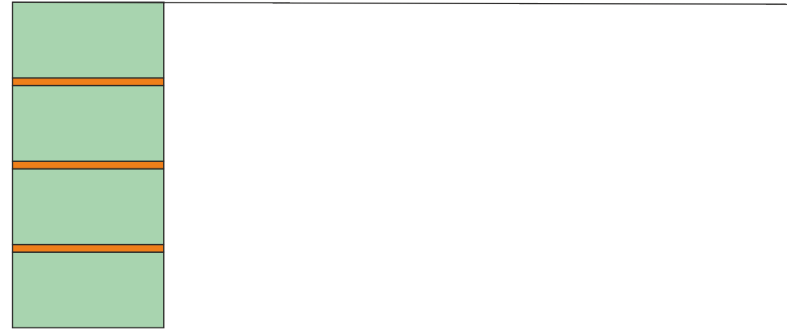
loss of 73 pads

- 1.) Should try to minimize loss of pads for everyone (Asian in particular)
- 2.) Base design (Connectors, pads and routing should be the same for everyone)
- 3.) Special design of HV feed through, add frames etc. can be adapted for every design.
- 4.) Pad rows possibly could be moved by 4mm up and down to adjust for specific requirements.
- 5.) Same could be done with 'half-full' modules of 1*6mm² pads on left and right side (mirror is easy).
- 6.) supply HV for field degrader and gating GEM on backside of pad plane
- 7.) include some switching of gating GEM?

Field degrader



side view



frond view

