

- The current STAR anode wire planes have one “fat” wire on each end to provide low gain near the ends of the grids
- We can replace one (or more) of the “thin” anode wires with “fat” wires to extend the region with low gain and reduce the “grid leak”
  - This substitution can be done when the wire planes are on the granite tables at Shandong University ... no advance-planning required
- Extra “fat” wires will force the centerline of the pad rows to move away from their original (old) locations by 14 mm
  - To keep an ideal pad response function, the pads must remain directly under a group of 4 anode wires and have 2 anode wires on either side of the pad

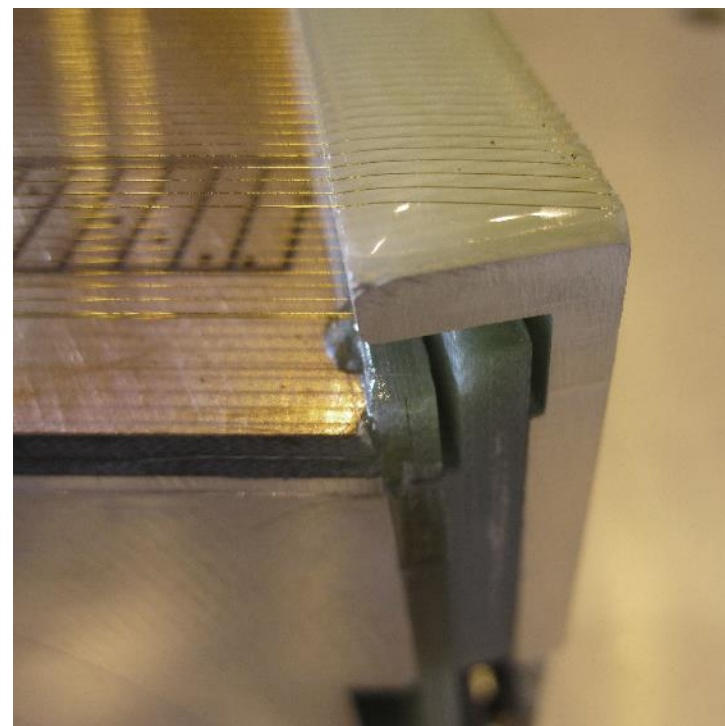
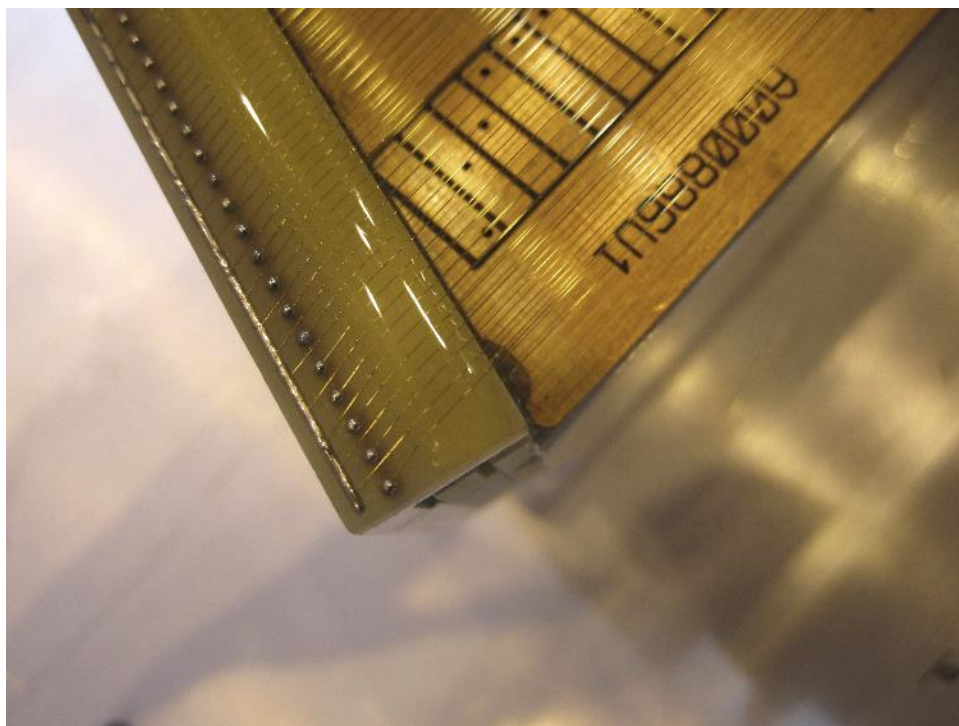
## Proposal:

- Build the new pad planes with a total of 3 “fat” wires on the top and 3 “fat” wires on the bottom of the anode grid
- Move the pad rows down 14 mm to accommodate the extra “fat” wires
- This will require changes to the padplane and strongback
- Simulations required to optimize the configuration

# Wire locations near the gap will not change



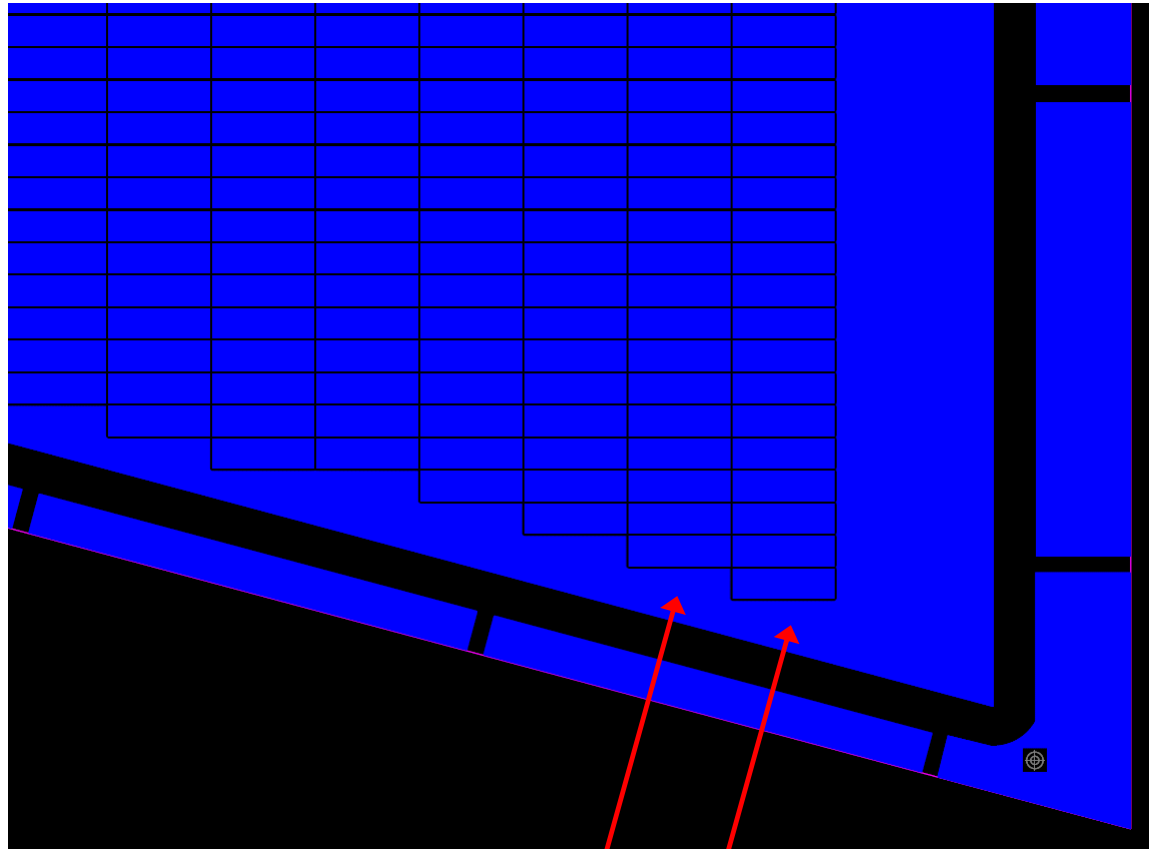
- The location of the wires near the inner/outer gap cannot change
  - Position and total number of wires on each plane remains the same
- Because ... it is not possible to add more wires
  - The full extent of the side mounted wire mounts are already used



# New Pad Plane design and layout



A corner of the new inner pad plane layout by John Hammond & Bob Scheetz



Row 39  
Row 40

Pad Row	# of Pads
1	50
2	52
3	54
4	56
5	58
6	60
7	62
8	62
9	64
10	66
11	68
12	70
13	72
14	74
15	74
16	76
17	78
18	80
19	82
20	84
21	86
22	86
23	88
24	90
25	92
26	94
27	96
28	98
29	98
30	100
31	102
32	104
33	106
34	108
35	110
36	110
37	112
38	114
39	116
40	118
<b>Total</b>	<b>3370</b>

# Location of Wires and Pads



References:  
 LBL Drawings  
 24A055,  
 24A373,  
 24A374

Radius (Y)	Description	
0.00	Center of STAR Detector (vtx)	<b>GATED GRID WIRE</b>
498.80	Bottom of Full size PC Board	Ø.075mm BeCu , Au plated
512.70	Tertiary Fiducial L & R	spacing 1mm
519.05	Strongback Bottom Edge	<b>OUTER : 689 Wires</b>
530.00	Gated Grid Wire 1	<b>INNER : 681 Wires</b>
531.00	Gated Grid Wire 2	<b>TOTAL : 1,370 Wires per Sector</b>
532.00	Anode Wire 1 & GG W-3	
536.00	Anode Wire 2 & GG W-7	<b>SHIELD GRID WIRE</b>
540.00	Anode Wire 3 & GG W-11	Ø.075mm BeCu , Au plated
540.25	Secondary Fiducial	spacing 1mm
544.00	Anode Wire 4 & GG W-15	<b>OUTER : 689 Wires</b>
548.00	Anode Wire 5 & GG W-19	<b>INNER : 681 Wires</b>
558.00	Pad Row 1 - Center	<b>TOTAL : 1,370 Wires per Sector</b>
574.00	Pad Row 2 - Center	
1166.00	Pad Row 39 - Center	<b>ANODE GRID WIRE</b>
1179.45	Primary Fiducial	Ø.020mm W, Au plated
1182.00	Pad Row 40 - Center	spacing 4mm
1192.00	Anode Wire 166 & GG W-663	<b>OUTER : 170 Wires</b>
1196.00	Anode Wire 167 & GG W-667	<b>INNER : 164 Wires (168 in old design)</b>
1200.00	Anode Wire 168 & GG W-671	<b>TOTAL : 334 Wires per Sector (338 in old design)</b>
1204.00	Anode Wire 169 & GG W-675	
1204.85	Alternate Primary Fiducial	
1208.00	Anode Wire 170 & GG W-679	<b>LAST ANODE WIRE</b>
1209.00	Gated Grid Wire 680	Ø.125mm BeCu , Au plated
1210.00	Gated Grid Wire 681	<b>OUTER : 2 Wires</b>
1214.32	Strongback Top Edge	<b>INNER : 6 Wires (2 in old design)</b>
1220.67	Tertiary Fiducial L & R	<b>TOTAL : 8 Wires per Sector (4 in old design)</b>
1235.42	Top of Full size PC Board	

Repeat pad rows  
 every 16 mm

Wire Locations are the same as before except for the replacement of 6 thin anode wires with larger diameter anode wires (0.020 mm ⇒ 0.125 mm)

## Backup Slides

# Possible changes at low radius to avoid grid leak



- We might wish to consider adding more wires to the grid at low radius
  - There is a grid leak at low radius as well as near the gap between the inner and outer sectors. We could add up to 7 GG wires and/or 2 anode wires.
  - We plan to put more “fat” wires on the low radius end of the pad plane, anyway ... but do we need the wires to run all the way to the end of the frame?
  - This would mean many changes: e.g. extra channels for ABDB boards, side wire mounts, etc. It may not be worth it. Very little space for extra boards/channels.
  - We could also consider putting a grounded “wall” at low radius in a style that is similar to be done at the gap between the inner and outer sectors
- Simulations required ... no change proposed until simulations prove need

