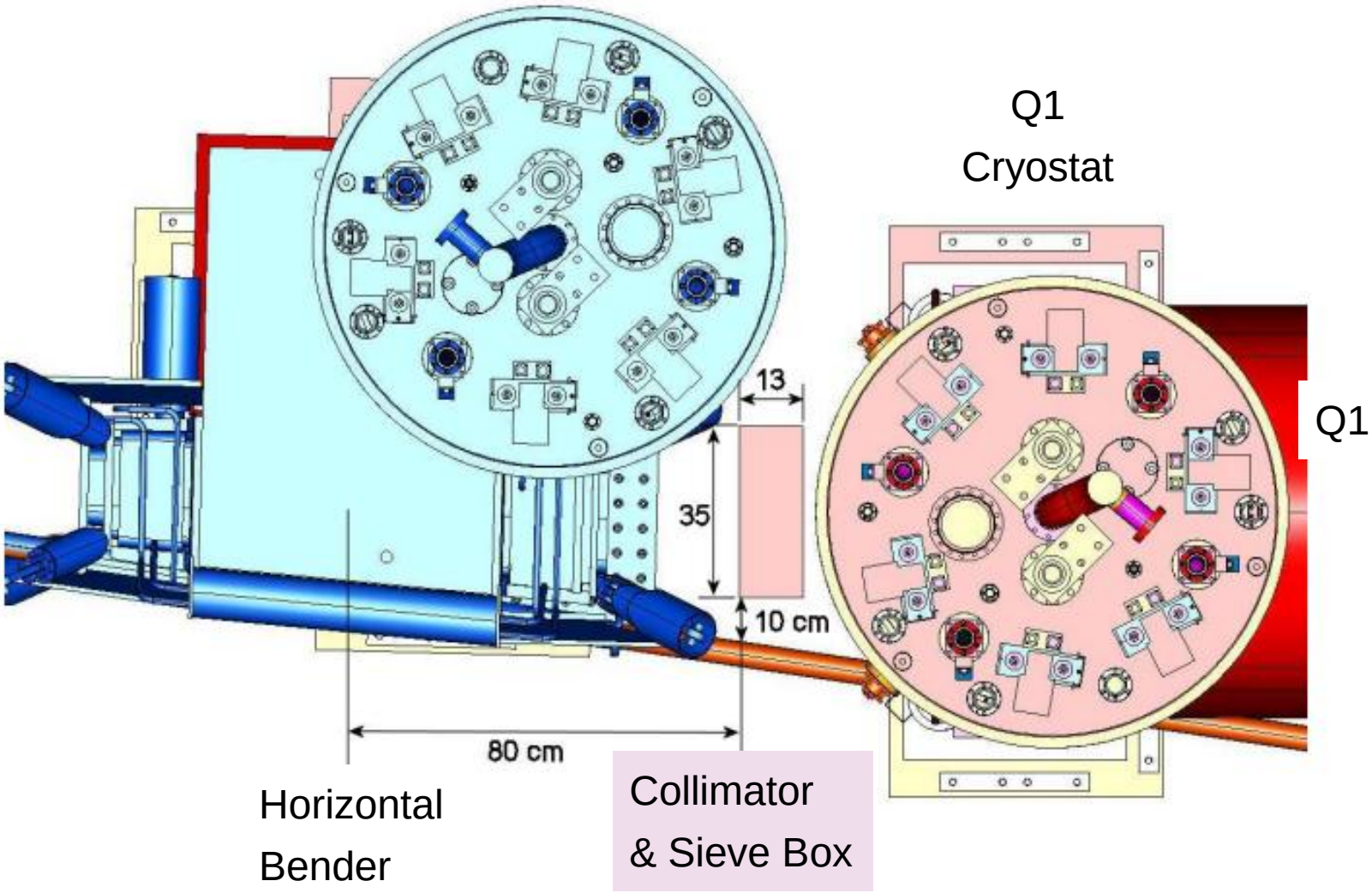
Sieve Slit and Collimator Update

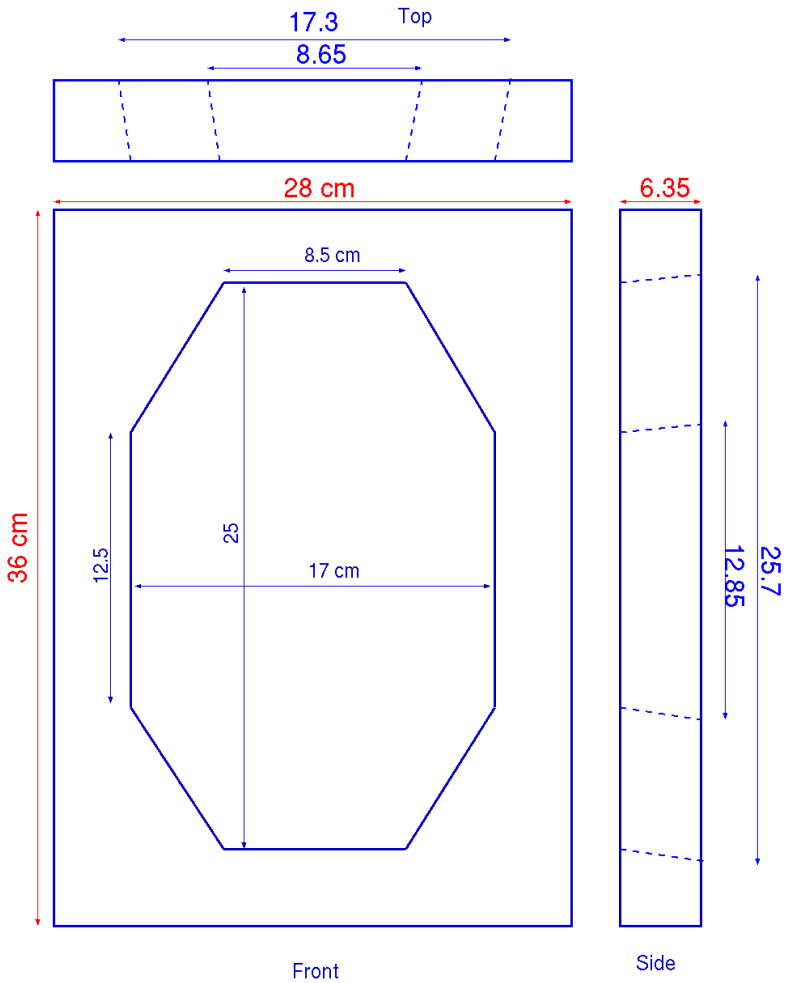
Mark Jones

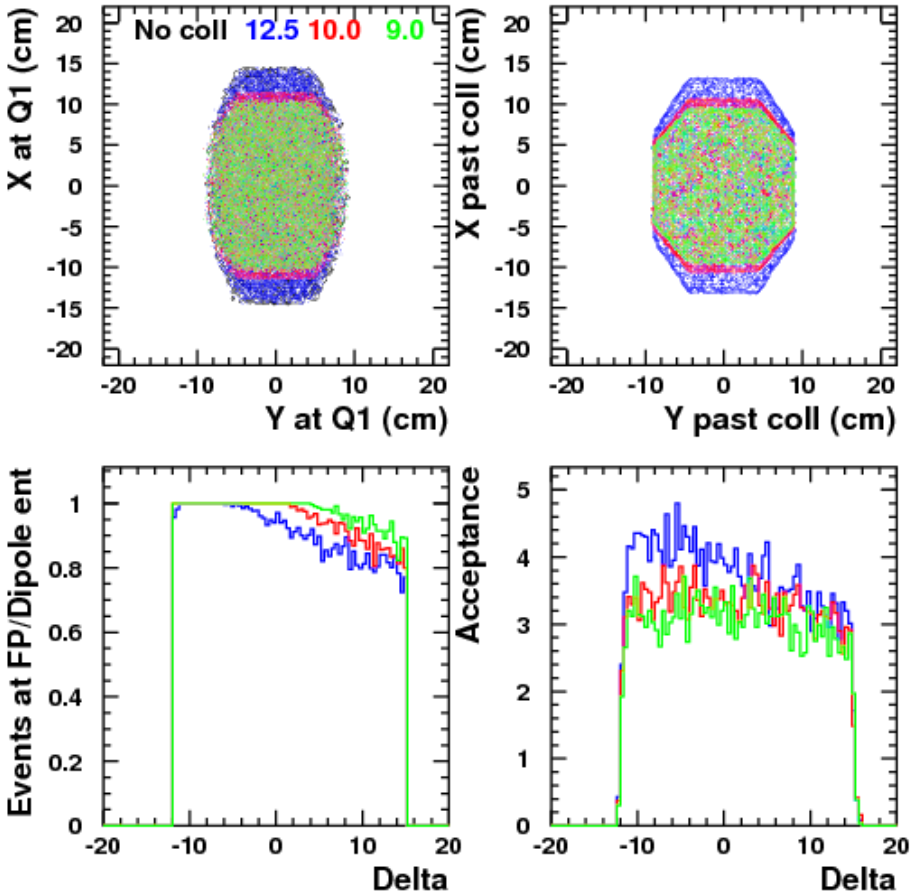
Collimator and Sieve Box Location



Updated Collimator Design

Compare +/- 12.5, 10 and 9 cm

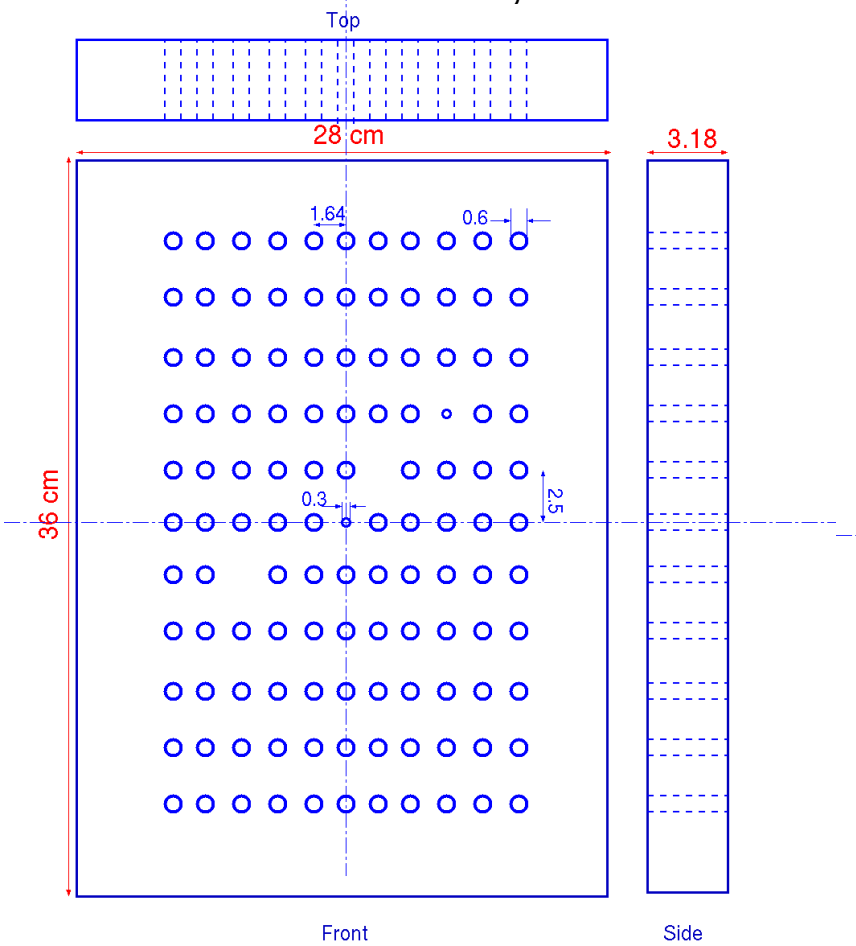


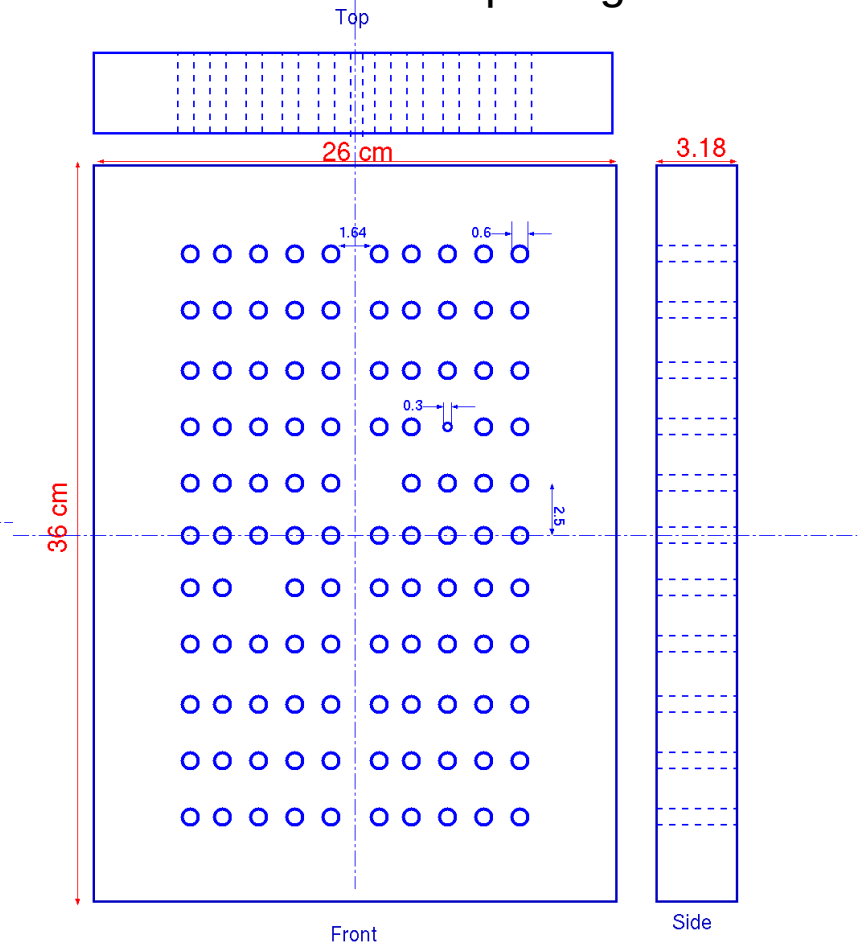


Sieve Slit

Two sieve slits with the hole pattern offset horizontally

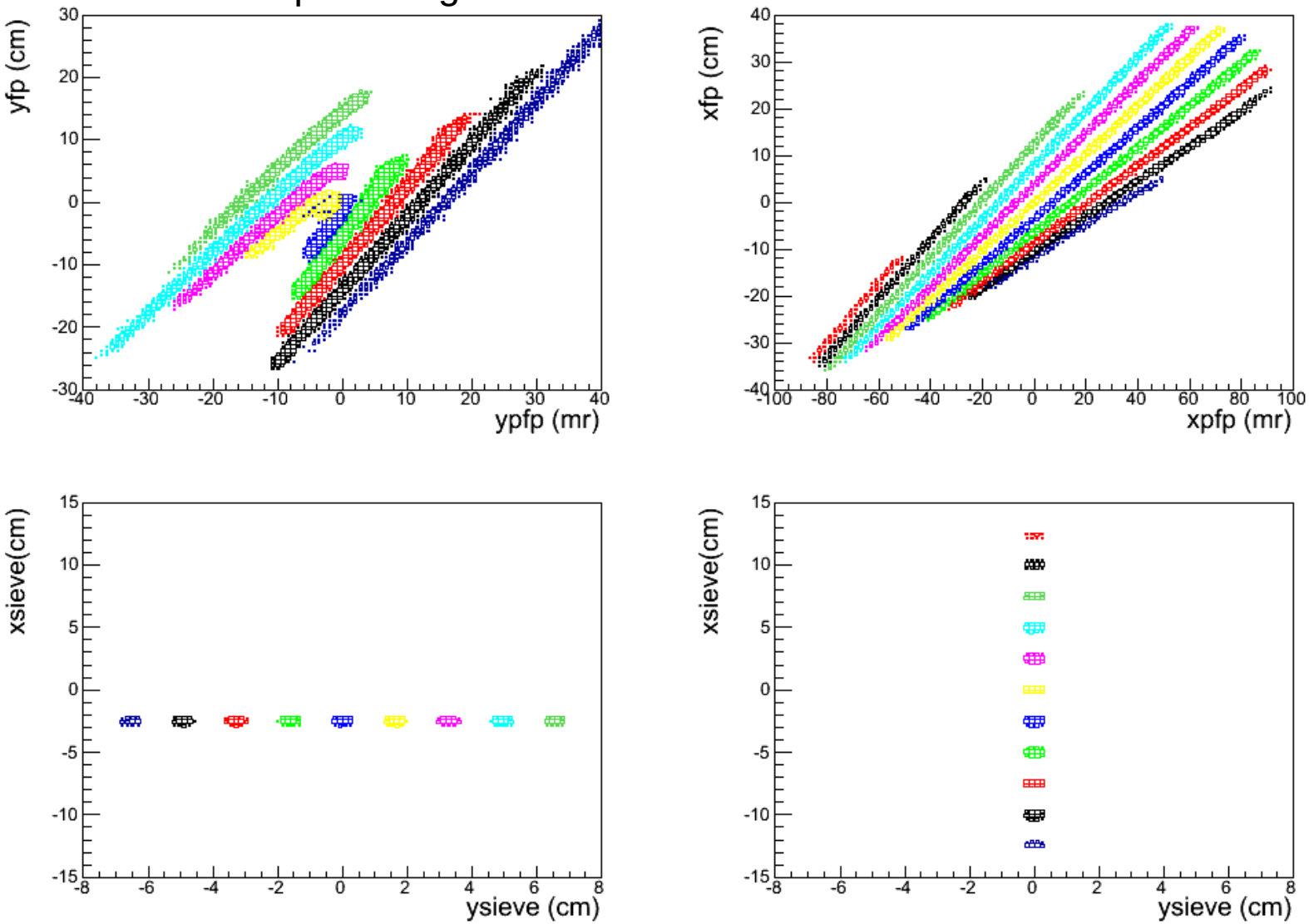
Hole size 0.6cm diameter, 2.5cm vertical & 1.64cm horizontal spacing





Focal plane distributions

Carbon point target --15% < Delta < 22%

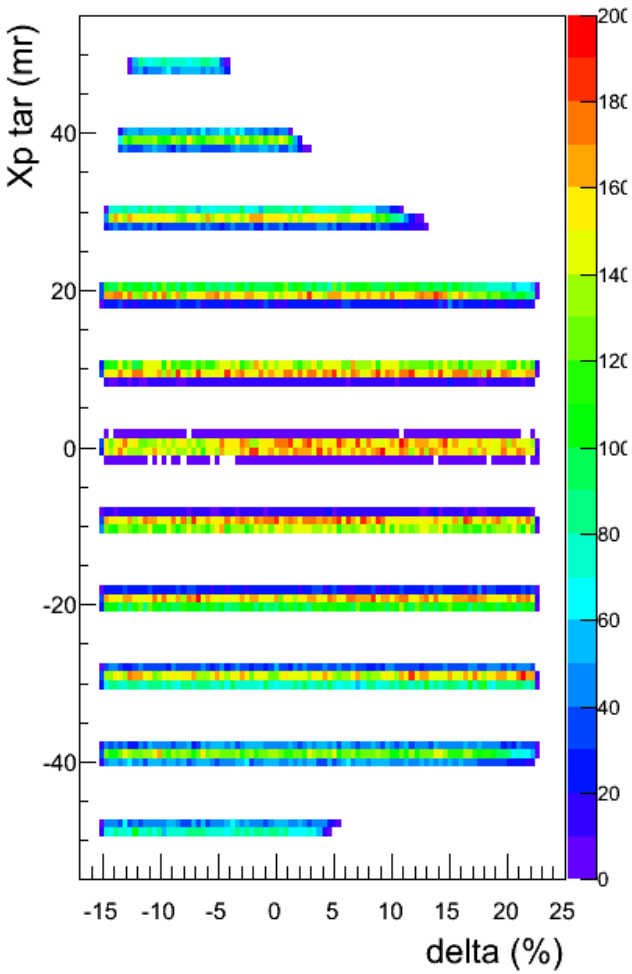


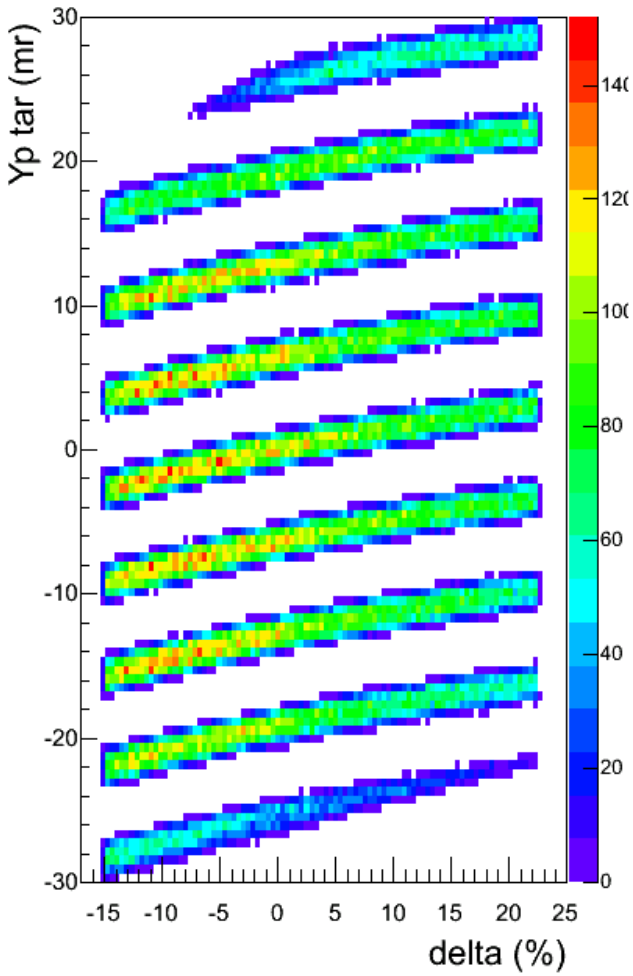
Focal plane distributions

Clearly see X'_{tar} holes

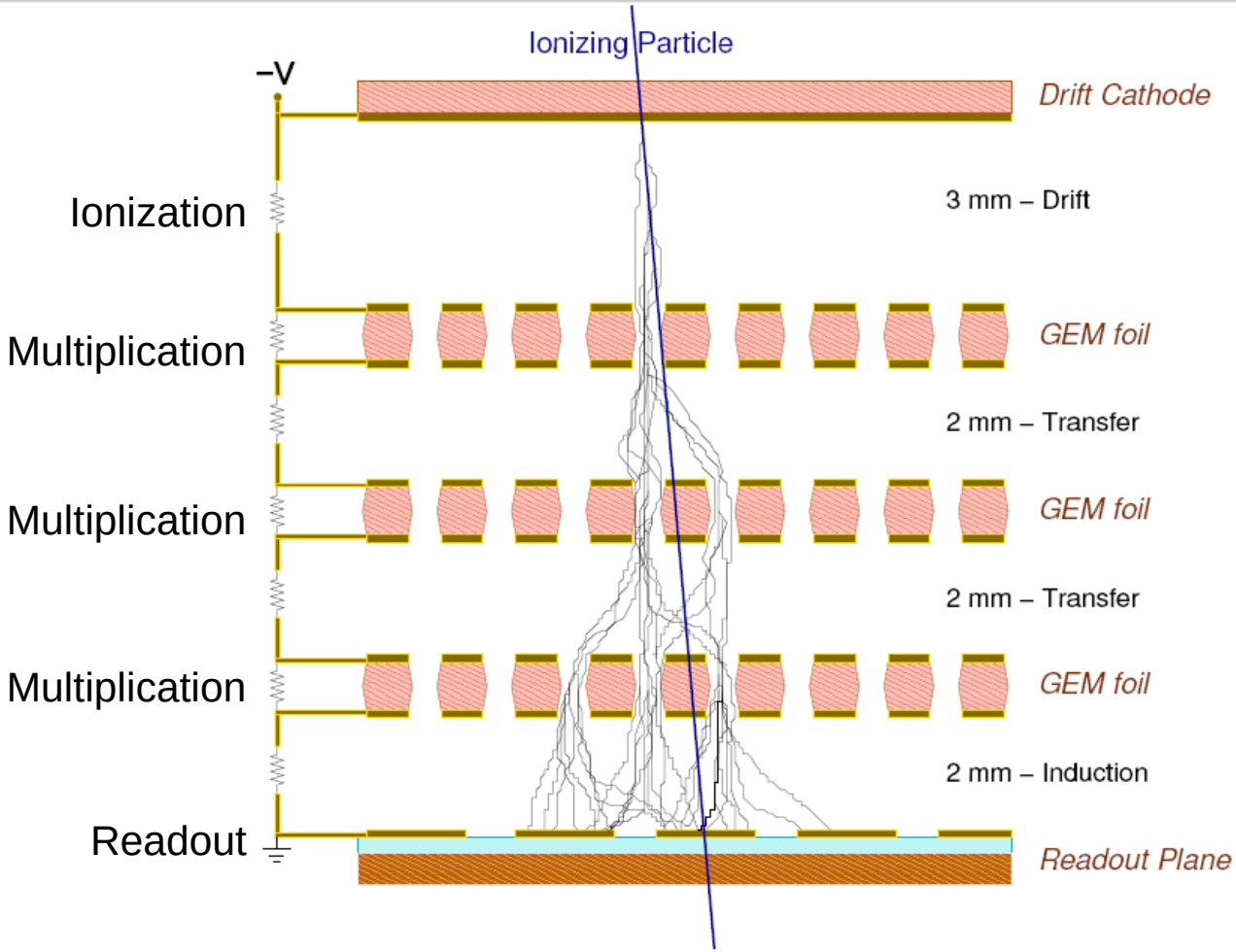
HB produces Y'_{tar} versus Delta correlation

$\Delta Y'_{tar} = 1mr$ when $\Delta Delta = 5\%$

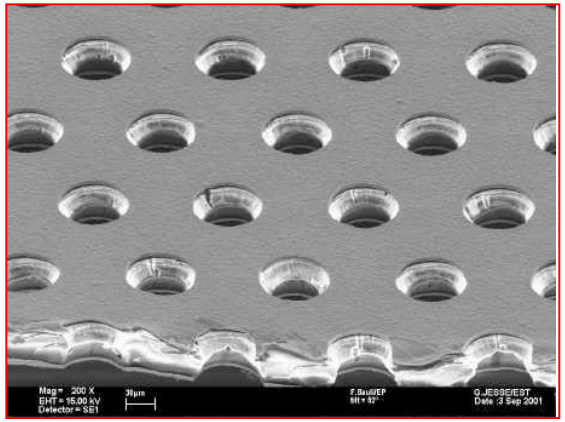


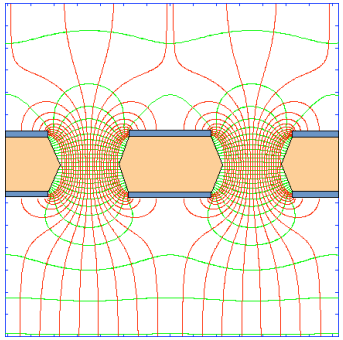


GEM principles



GEM foil: 50 μm Kapton + few μm copper on both sides with 70 μm holes, 140 μm pitch

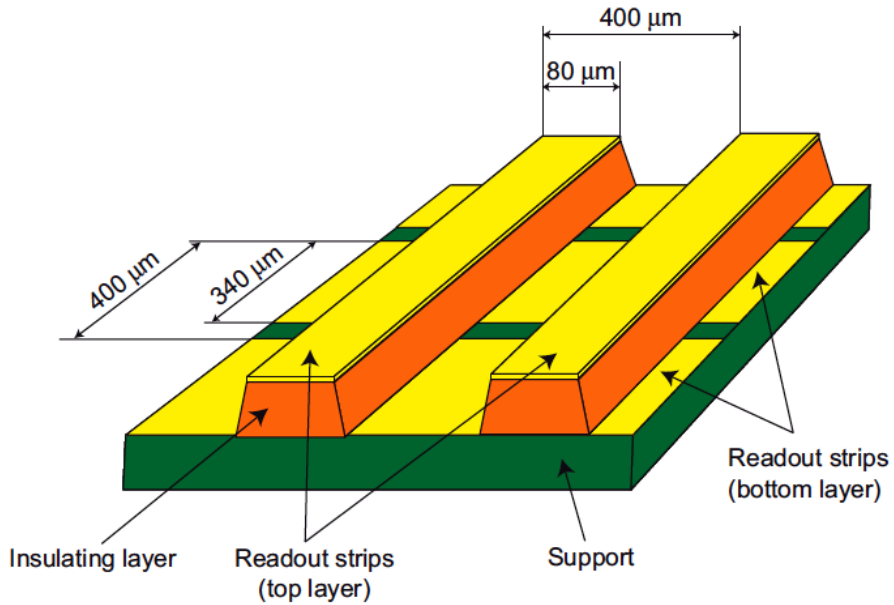


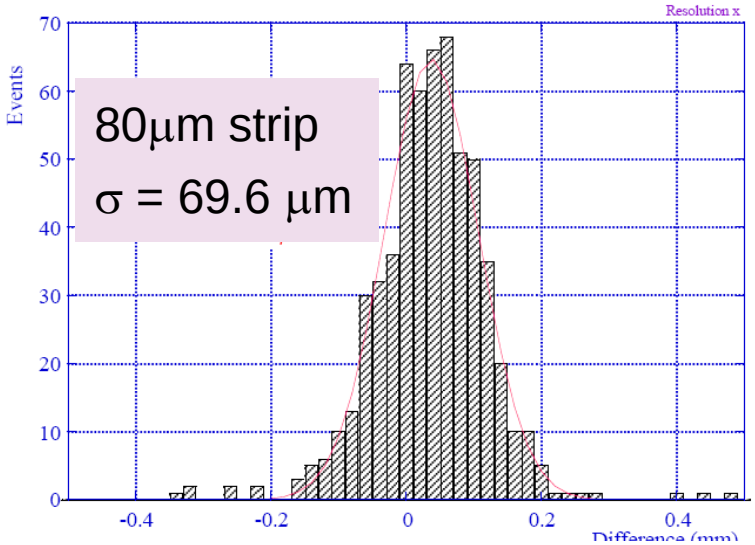


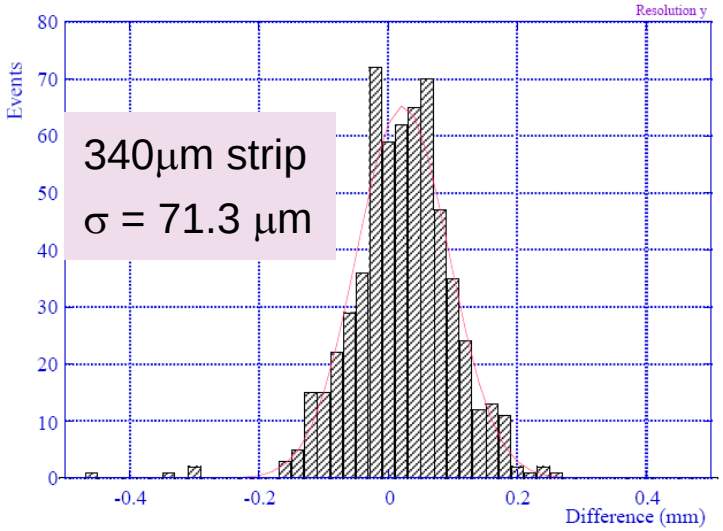
Strong electrostatic field in the GEM holes

F. Sauli, Nucl. Instrum. Methods A386(1997)531

Spatial Resolution in COMPASS



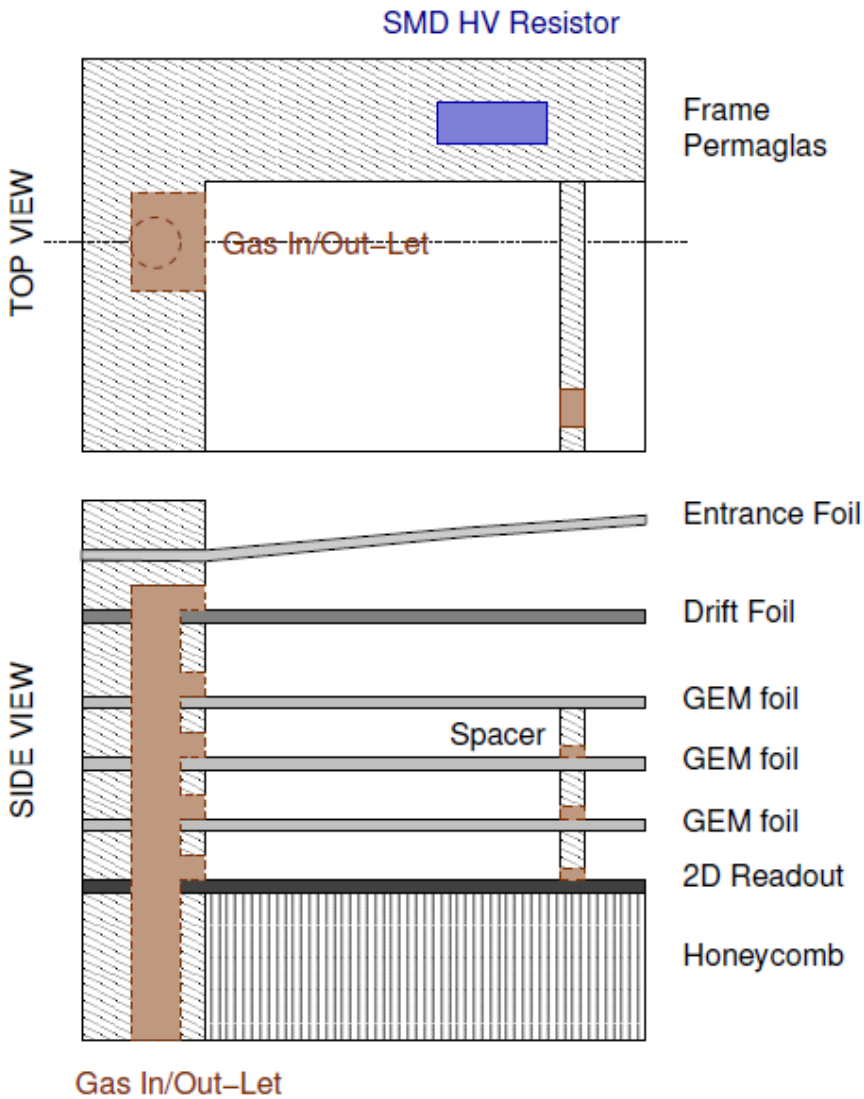




COMPASS readout plane (33x33 cm²) and results
(analog readout)

C. Altunbas et al.
NIMA 490 (2002) 177

Hall A GEMs

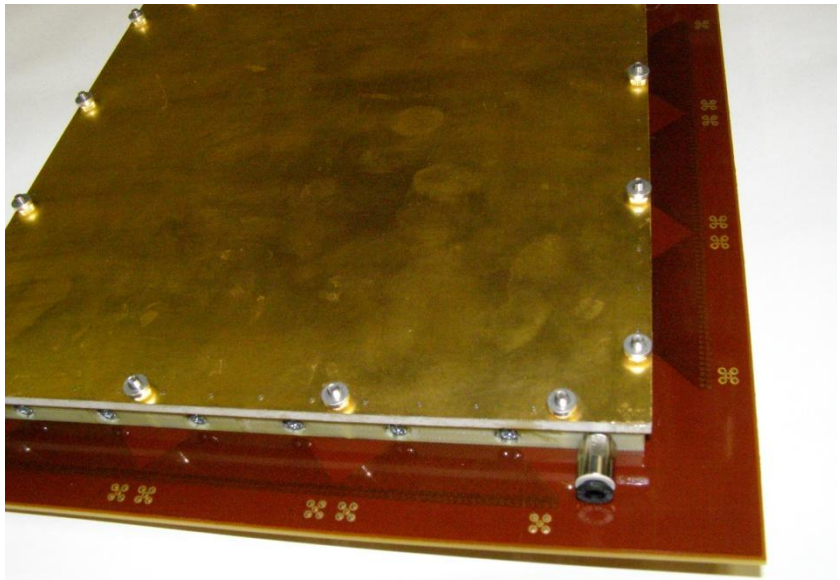


	Quantity	*Thickness*	*Density*	*X0*	*Area*	*X0*	*S-Density*
		μm	*g/cm3*	*mm*	*Fraction*	*%*	*g/cm2*
Window							
Mylar	1	10	1.39	287	1	0.0035	0.0014
Drift							
Copper	1	3	8.96	14.3	1	0.0210	0.0027
Kapton	1	50	1.42	286	1	0.0175	0.0071
GEM Foil							
Copper	6	3	8.96	14.3	0.8	0.1007	0.0129
Kapton	3	50	1.42	286	0.8	0.0420	0.0170
Grid Spacer							
G10	3	2000	1.7	194	0.008	0.0247	0.0082
Readout							
Copper-80	1	3	8.96	14.3	0.2	0.0042	0.0005
Copper-350	1	3	8.96	14.3	0.75	0.0157	0.0020
Kapton	1	30	1.42	286	0.2	0.0021	0.0009
G10	1	120	1.7	194	1	0.0619	0.0204
NoFlu glue	1	60	1.5	200	1	0.0300	0.0090
Honeycomb							
Nomex	1	6000	1	13125	1	0.0457	0.6000
G10	2	120	1.7	194	1	0.1237	0.0408
Gas							
(CO2)	1	9000	1.84E-03	18310	1	0.0492	0.0017
					Total	**0.542**	**0.725**

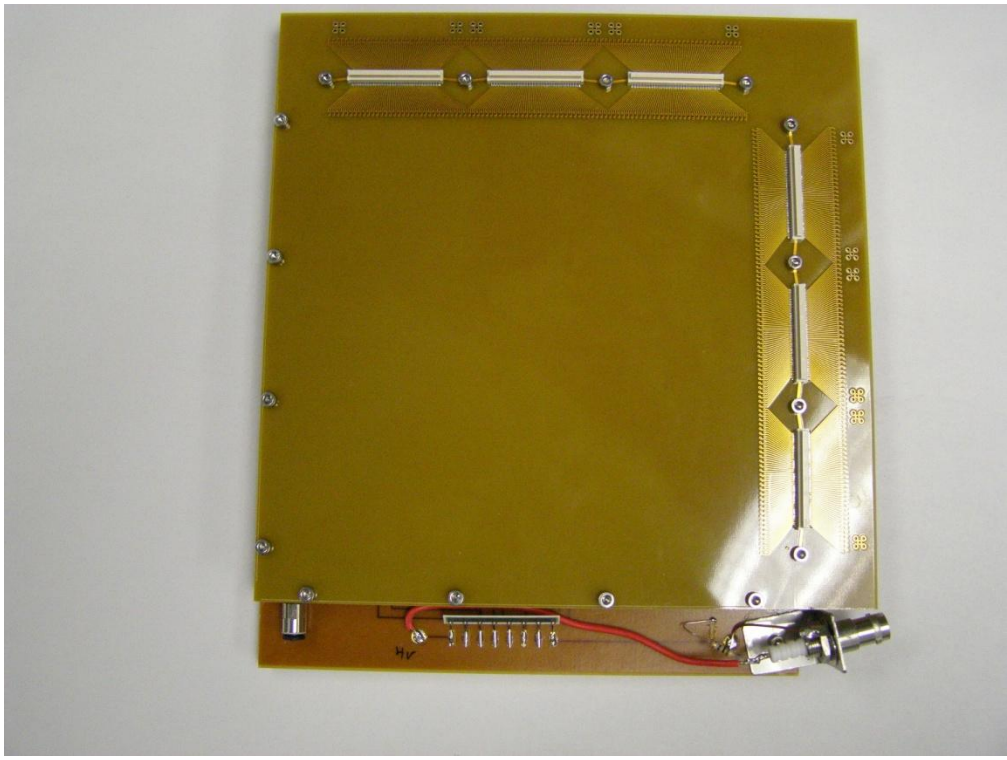
Total thickness 0.5% radiation lengths

Present status

- Mississippi State has bought two 16x16 GEMs and assembled them.
- Placed an order for the CERN SRS readout system.
- Planning to work at UVa with their working setup to gain experience.



Top view of 16x16cm GEM



Bottom view of 16x16cm GEM

Conclusion

- Slit box with collimator and two sieves between HB and Q1
- Collimator gives 4msr solid angle with average 10% loss in dipole.
- Additional sieve instead of a small acceptance collimator
- GEM detector in front of HB to characterize the HB
- Need to look into having special sieve and collimators to have for commissioning that could be attached to snout.
- Suggest to form a small working group to develop the optics commissioning plan.