



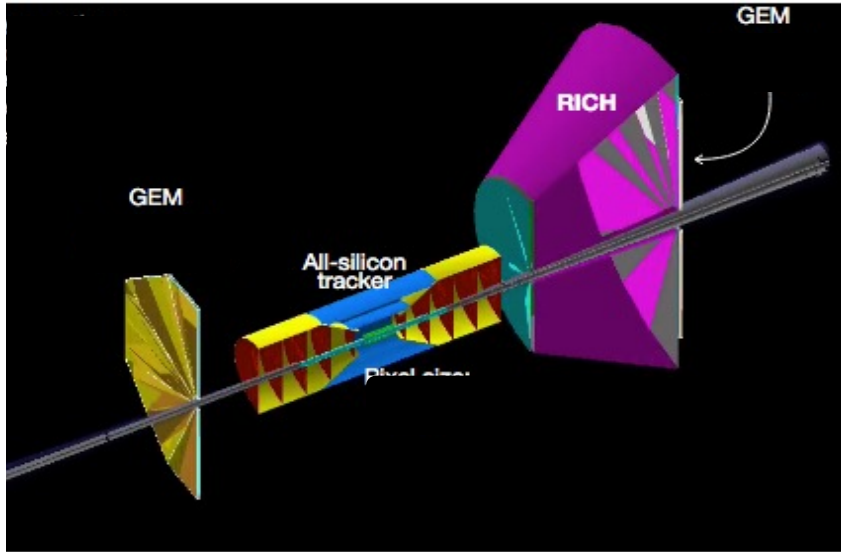
ATHENA silicon tracker concepts (draft slides)

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EICSC meeting with steering committees

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Minimal configuration: all-silicon



Silicon Tracker (2 Vertex + 4 Barrel Layers)

R (cm)	Length (cm)	Resolution	Active Area Material (X/X0 %)
3.3	30.0	10 um pixel pitch	0.05
5.7	30.0	10 um pixel pitch	0.05
21.0	54.0	10 um pixel pitch	0.55
22.68	60.0	10 um pixel pitch	0.55
39.3	105.0	10 um pixel pitch	0.55
43.23	114.0	10 um pixel pitch	0.55

Silicon Tracker (2 Vertex + 4 Barrel Layers)

Inner R (cm)	Outer R (cm)	Z Position (cm)	Resolution	Active Area Material (X/X0 %)
3.18	18.50	25.0	10 um pixel pitch	0.24
3.18	36.26	49.0	10 um pixel pitch	0.24
3.5	43.23	73.0	10 um pixel pitch	0.24
4.7	43.23	97.0	10 um pixel pitch	0.24
5.91	43.23	121.0	10 um pixel pitch	0.24

Silicon Tracker (2 Vertex + 4 Barrel Layers)

Inner R (cm)	Outer R (cm)	Z Position (cm)	Resolution	Active Area Material (X/X0 %)
3.18	18.50	-25.0	10 um pixel pitch	0.24
3.18	36.26	-49.0	10 um pixel pitch	0.24
3.18	43.23	-73.0	10 um pixel pitch	0.24
3.7	43.23	-97.0	10 um pixel pitch	0.24
4.41	43.23	-121.0	10 um pixel pitch	0.24

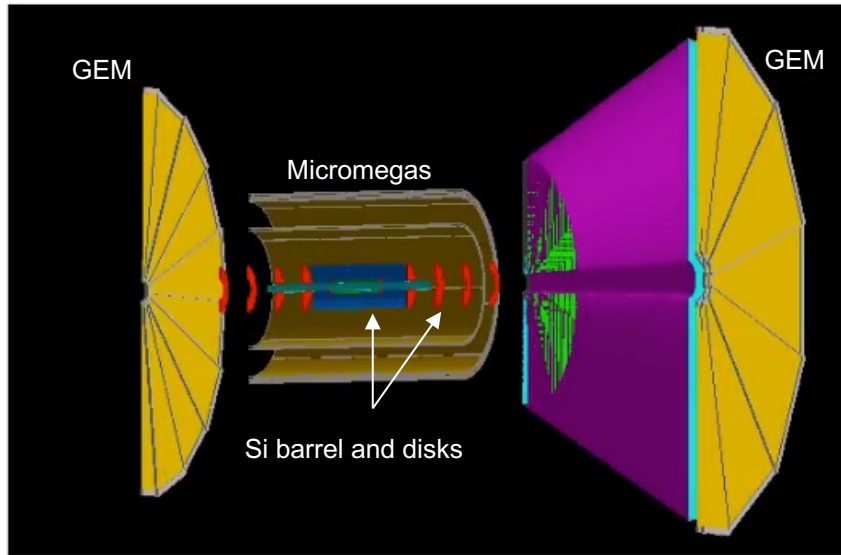
Outer Triple-GEM Trackers

Eta Min.	Eta Max.	Z Position (cm)	Resolution	Active Area Material (X/X0 %)
1.4	3.69	300.0	250 um (r) x 50 um (r-phi)-- verify this is being used	0.7

Outer Triple-GEM Trackers

Eta Min.	Eta Max.	Z Position (cm)	Resolution	Active Area Material (X/X0 %)
-1.54	-3.9	-180.0	250 um (r) x 50 um (r-phi)-- verify this is being used	0.7

Minimal configuration: hybrid



Silicon Tracker (3 vertex + 2 barrel layers)

R (cm)	Length (cm)	Resolution	Active Area Material (X/X0 %)
3.64	42.0	10 um pixel pitch	0.05
4.45	42.0	10 um pixel pitch	0.05
5.26	42.0	10 um pixel pitch	0.05
13.38	84.0	10 um pixel pitch	0.55
18.0	84.0	10 um pixel pitch	0.55

Micromegas Barrel (2 + 4 barrel layers)

R (cm)	Length (cm)	Resolution	Active Area Material (X/X0 %)
47.715	188.0	150 um (r-phi) x 150 um (z)	0.4
49.57	188.0	150 um (r-phi) x 150 um (z)	0.4
71.89	188.0	150 um (r-phi) x 150 um (z)	0.4
73.75	188.0	150 um (r-phi) x 150 um (z)	0.4
75.61	188.0	150 um (r-phi) x 150 um (z)	0.4
77.47	188.0	150 um (r-phi) x 150 um (z)	0.4

Silicon Disks

Inner R (cm)	Outer R (cm)	Z Position (cm)	Resolution	Active Area Material (X/X0 %)
3.64	7.13	22.0	10 um pixel pitch	0.24
3.64	19.0	46.75	10 um pixel pitch	0.24
4.65	19.0	71.5	10 um pixel pitch	0.24
7.25	19.0	96.25	10 um pixel pitch	0.24
9.93	19.0	121.0	10 um pixel pitch	0.24

Silicon Disks

Inner R (cm)	Outer R (cm)	Z Position (cm)	Resolution	Active Area Material (X/X0 %)
3.64	7.13	-22.0	10 um pixel pitch	0.24
3.64	19.0	-46.75	10 um pixel pitch	0.24
4.65	19.0	-71.5	10 um pixel pitch	0.24
7.25	19.0	-96.25	10 um pixel pitch	0.24
9.93	19.0	-121.0	10 um pixel pitch	0.24

Outer Triple-GEM Trackers

Inner R (cm)	Outer R (cm)	Z Position (cm)	Resolution	Active Area Material (X/X0 %)
21.0	210.0	305.0	250 um (r) x 50 um (r-phi)	0.4
21.0	210.0	310.0	250 um (r) x 50 um (r-phi)	0.4

Outer Triple-GEM Trackers

Inner R (cm)	Outer R (cm)	Z Position (cm)	Resolution	Active Area Material (X/X0 %)
11.0	170.0	-190.0	250 um (r) x 50 um (r-phi)	0.4

Both configurations

- **10 μm** pixel pitch
- **0.05% X/X0** vertex layers
- **0.55% X/X0** barrel layers
- **0.24% X/X0** disks

- For more details:

<https://indico.bnl.gov/event/11463/contributions/52587/attachments/36366/59762/20210804-ATHENA-tracking.pdf>