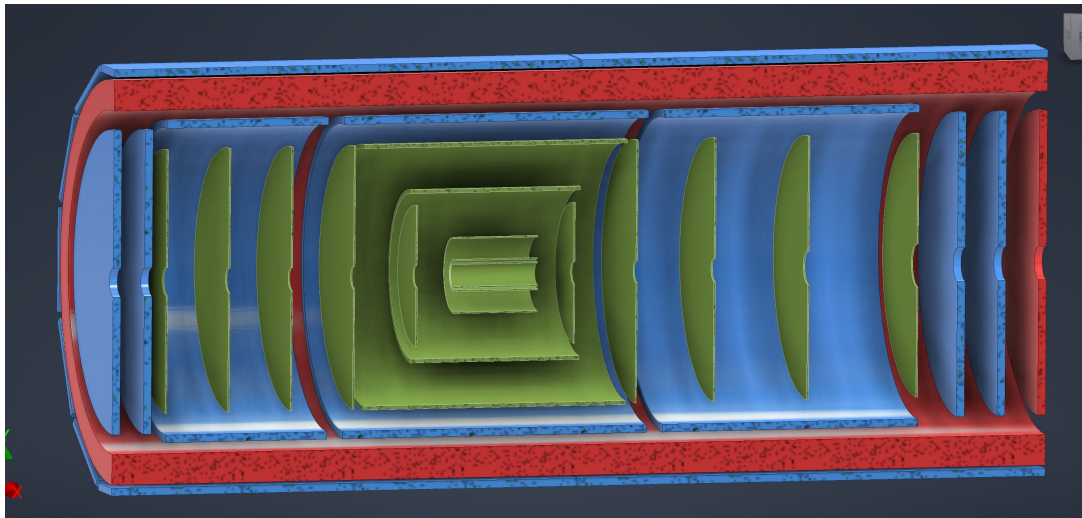


Crater Lake (23.07.2)



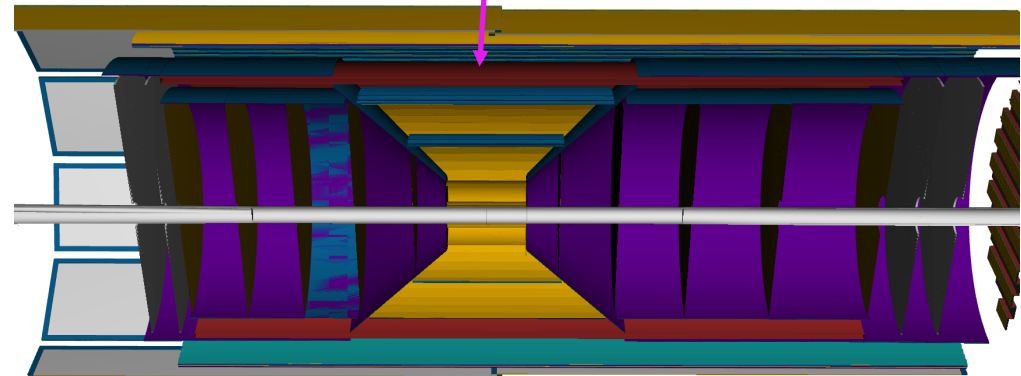
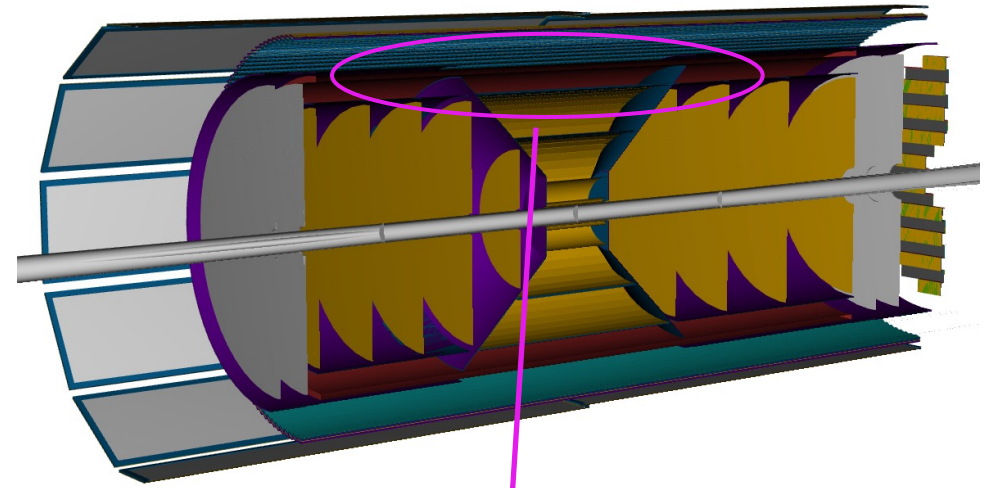
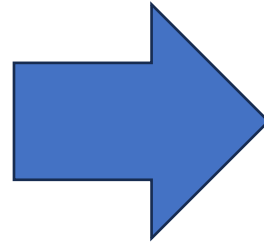
SVT

MPGDs

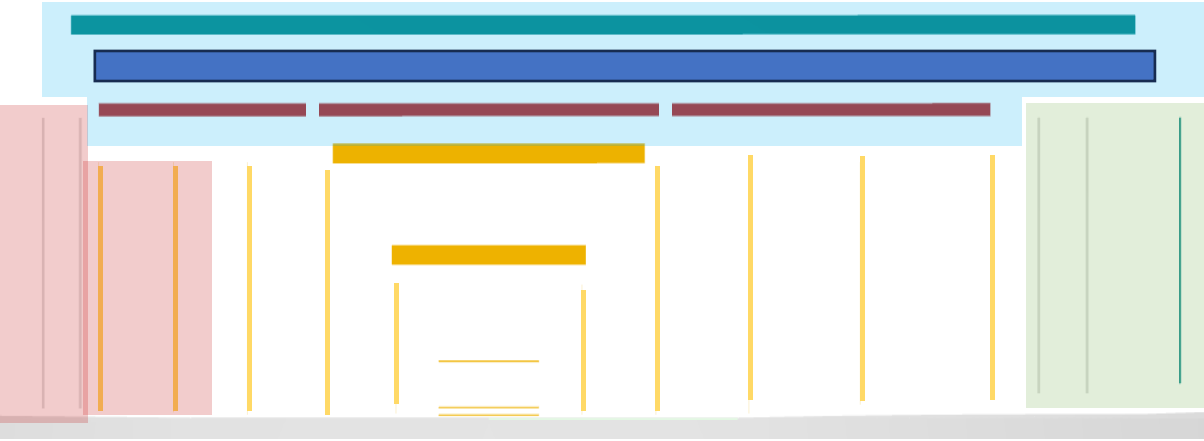
ToF (fiducial volume)

➤ Add MPGD layers to provide fast timing hits for pattern recognition and background/signal discrimination

- Inner MPGD barrel layer implemented a single layer
- Non-trivial to implement segmented barrel into ACTS



Crater Lake (23.07.2)



Negative Endcap Region

	Z-position	Rmin	Rmax
Si Disk (1)	-250 mm	36.76 mm	240 mm
Si Disk (2)	-450 mm	36.76 mm	415 mm
Si Disk (3)	-650 mm	36.76 mm	421.4 mm
Si Disk (4)	-850 mm	40 mm	421.4 mm
Si Disk (5)	-1050 mm	46.35 mm	421.4 mm
MPGD Disk (1)	-1100 mm	46.5 mm	500 mm
MPGD Disk (2)	-1200 mm	46.5 mm	500 mm

Central Region

Detector	Z min	Z max	R
Si Vertex (1)	-135 mm	135 mm	36 mm
Si Vertex (2)	-135 mm	135 mm	48 mm
Si Vertex (3)	-135 mm	135 mm	120 mm
Si Barrel (1)	-260 mm	260 mm	270 mm
Si Barrel (2)	-420 mm	420 mm	430 mm
Inner MPGD Barrel	-1050 mm	1350 mm	510 mm
Barrel ToF	-1125 mm	1740 mm	630 mm
Outer MPGD Barrel	-1740 mm	1675 mm	695 mm

Positive Endcap Region

	Z-position	Rmin	Rmax
Si Disk (1)	250 mm	36.76 mm	240 mm
Si Disk (2)	450 mm	36.76 mm	415 mm
Si Disk (3)	700 mm	38.46 mm	421.4 mm
Si Disk (4)	1000 mm	53.43 mm	421.4 mm
Si Disk (5)	1350 mm	70.14 mm	421.4 mm
MPGD Disk (1)	1480 mm	70.14 mm	500 mm
MPGD Disk (2)	1610 mm	70.14 mm	500 mm
ToF Disk	1870 mm	85 mm	500 mm

MPGD Routing and Service Estimate: (23.07.2)

❑ Detector Segmentation Assumptions

- Endcap = 2 half disk modules
- Outer barrel = 2 planar modules
- Inner barrel = 50 cm x 70 cm tiles (module)

❑ Electronic Assumptions

- 2D readout with 1 mm pitch
- 64 ch/ASIC
- 8 ASIC / FEE

❑ Includes services

- HV, LV, FEE (Power/Fiber Optic)
- Gas and cooling tubings

❑ Effective radiation length calculated per module and averaged over azimuth



	Avg X0	Al Thickness (cm)
(BE1 + BE2 + IB1 + IB2 + OB1) $z < -167.5$	0.09557857	0.850362537
(BE1 + BE2 + IB1 + IB2) $-167.5 < z < -120$	0.064545617	0.57426235
(BE1 + IB1 + IB2) $-120 < z < -110$	0.049796311	0.443037781
(IB1 + IB2) $-110 < z < -105$	0.035047006	0.311813212
(IB2) $-105 < z < -48.75$	0.017523503	0.155906606
() $-48.75 < z < 48.75$	0	
(IB3) $48.75 < z < 53.75$	0.017523503	0.155906606
(IB3 + IB4) $53.75 < z < 135$	0.035047006	0.311813212
(IB3 + IB4 + IB5) $135 < z < 148$	0.052570509	0.467719818
(IB3 + IB4 + IB5 + FE1) $148 < z < 161$	0.067319814	0.598944387
(IB3 + IB4 + IB5 + FE1 + FE2) $161 < z < 174$	0.082069119	0.730168956
(IB3 + IB4 + IB5 + FE1 + FE2 + OB2) $174 < z$	0.113102073	1.006269143

Service Comparison

□ Performance expectations

- Si layers dominate performance, real impact of MPGDs will be evident in realistic tracking with backgrounds
- Overall reduction of material should lead to comparable -to-better performance than Bryce Canyon
- **But**, slight worst resolution in backward direction due to shorter lever arm of Si disk array

