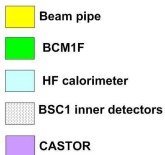


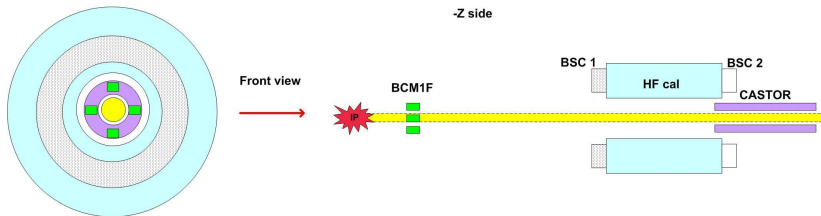
Hit rates for BCM1F sensors

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Task: calculate hit rates for BCM1F sensors using FLUKA simulations.



Subdetector	Distance to IP	Inner diameter	Outer diameter
BCM1F	1.8m	~100mm	~200mm
BSC1	10.9m	415.75mm	880mm
HF	14.4m	250mm	
CASTOR	14.38	~80	350mm



I generated pp collisions using FOCUS (FLUKA for CMS users) - time consuming

1 pp collision = 1 event (with particles going through some specified volume)

I counted how often generated particles pass through each of the sensor.

Note that if in one event two particles reached the same sensor it still counts as 1 entry in the hit rate (sensors are not sensible to number of crossing particles)

Results for individual sensors

Hit rate for - Z top sensor: $4 / 720 = 0.005$

Hit rate for - Z far sensor: $6 / 720 = 0.008$

Hit rate for - Z bottom sensor: $8 / 720 = 0.011$

Hit rate for - Z near sensor: $5 / 720 = 0.007$

Hit rate for - Z top sensor: $4 / 720 = 0.006$

Hit rate for - Z near sensor: $8 / 720 = 0.011$

Hit rate for - Z bottom sensor: $8 / 720 = 0.011$

Hit rate for - Z far sensor: $9 / 720 = 0.013$

I checked the hit rates for separate events (not individual sensor) for 4 cases:

Z minus OR Z plus: $49 / 720 = 0.068$

Z minus no Z plus: $21 / 720 = 0.029$

Z plus no Z minus: $26 / 720 = 0.036$

Z minus AND Z plus: $2 / 720 = 0.003$

Next step: take few pp collisions and treat them as 1 event

for 5 pp collisions in event:

Z minus OR Z plus: $43 / 126 = 0.34$

Z minus no Z plus: $18 / 126 = 0.14$

Z plus no Z minus: $21 / 126 = 0.16$

Z minus AND Z plus: $4 / 126 = 0.03$

(does not work properly yet)