

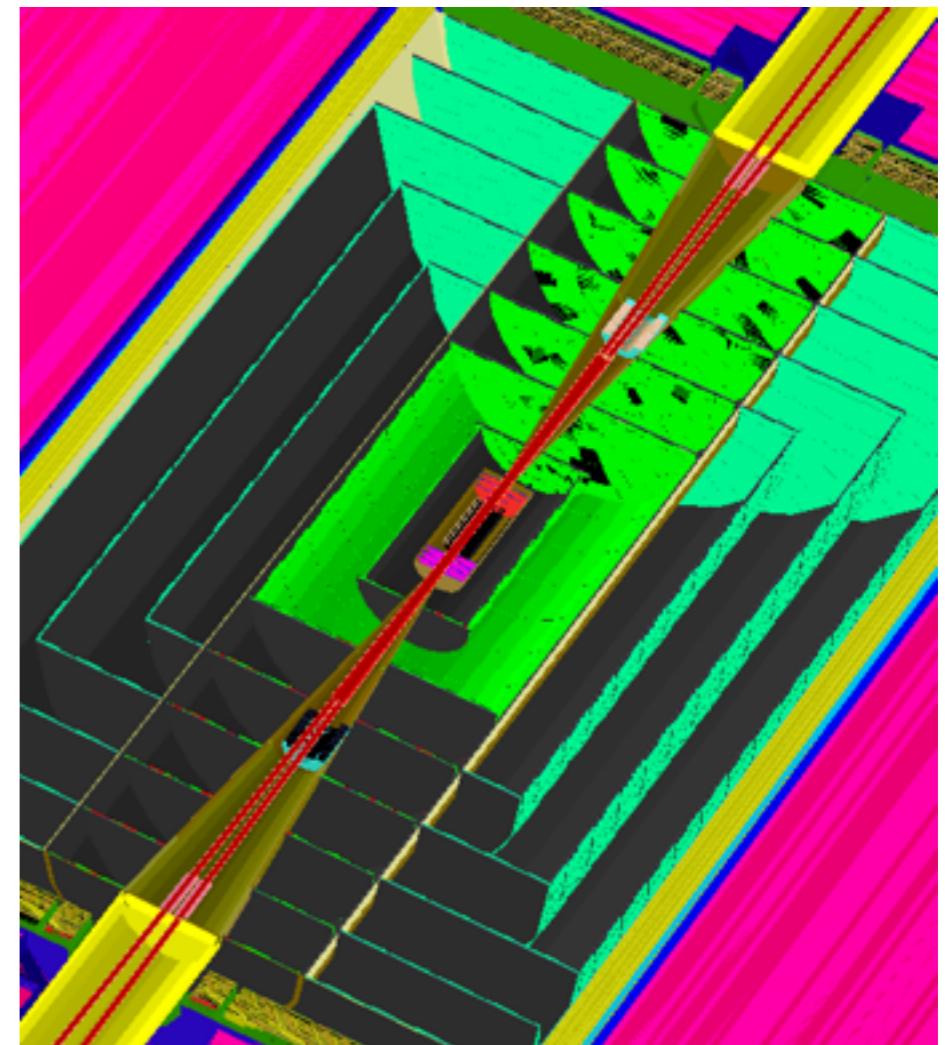


Follow up on SR Simulations

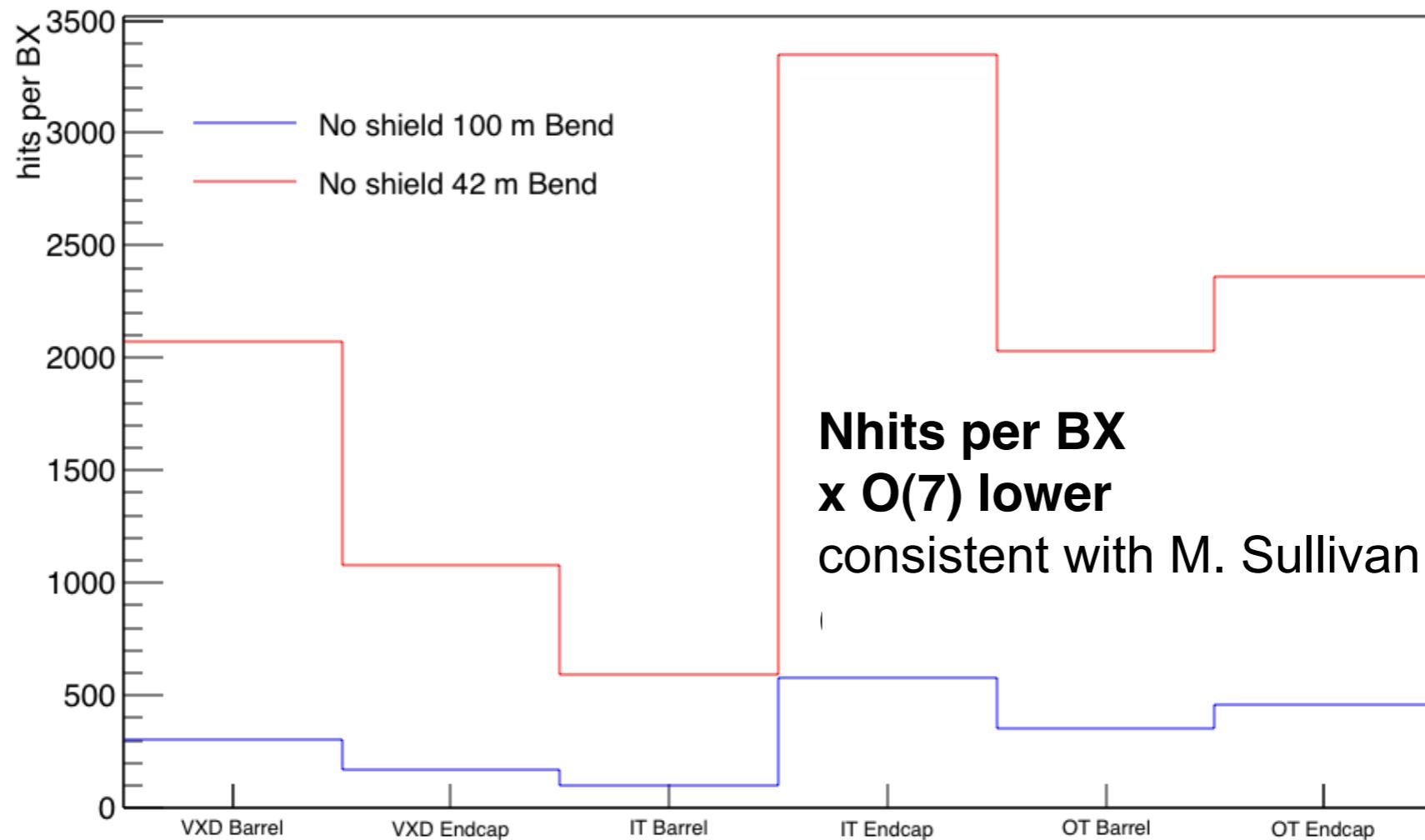
Anna Kolano
Emmanuel Perez

Since last time:

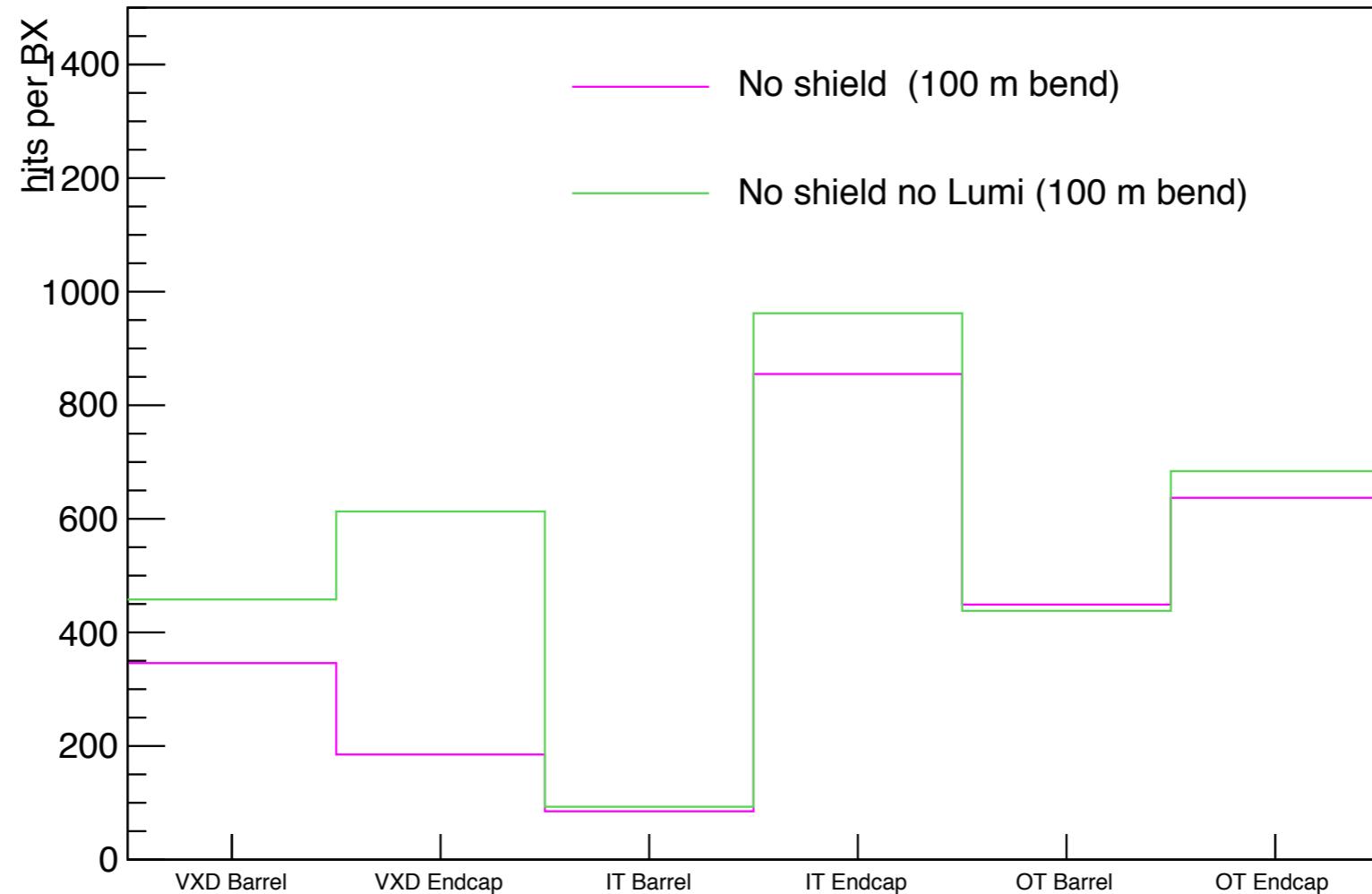
- Occupancy **42 m** - Here we start looking at **100 m bend** 7x better
- 500um **beam pipe (BP)** - preliminary modelling of beam pipe param matching Mike S.
- (20 mm inner radius + 2 mm Be + 25um Au)
- **Lumi/no Lumi** comparison
- $1.37 * 10^7$ photons/BX/beam
- Understanding **occupancy trends**: removing disks, beam pipes, energy variation etc
- **Our Geant4 vs Mike S. models**



Comparison of SR on the IR at 42 m vs 100 m final bend



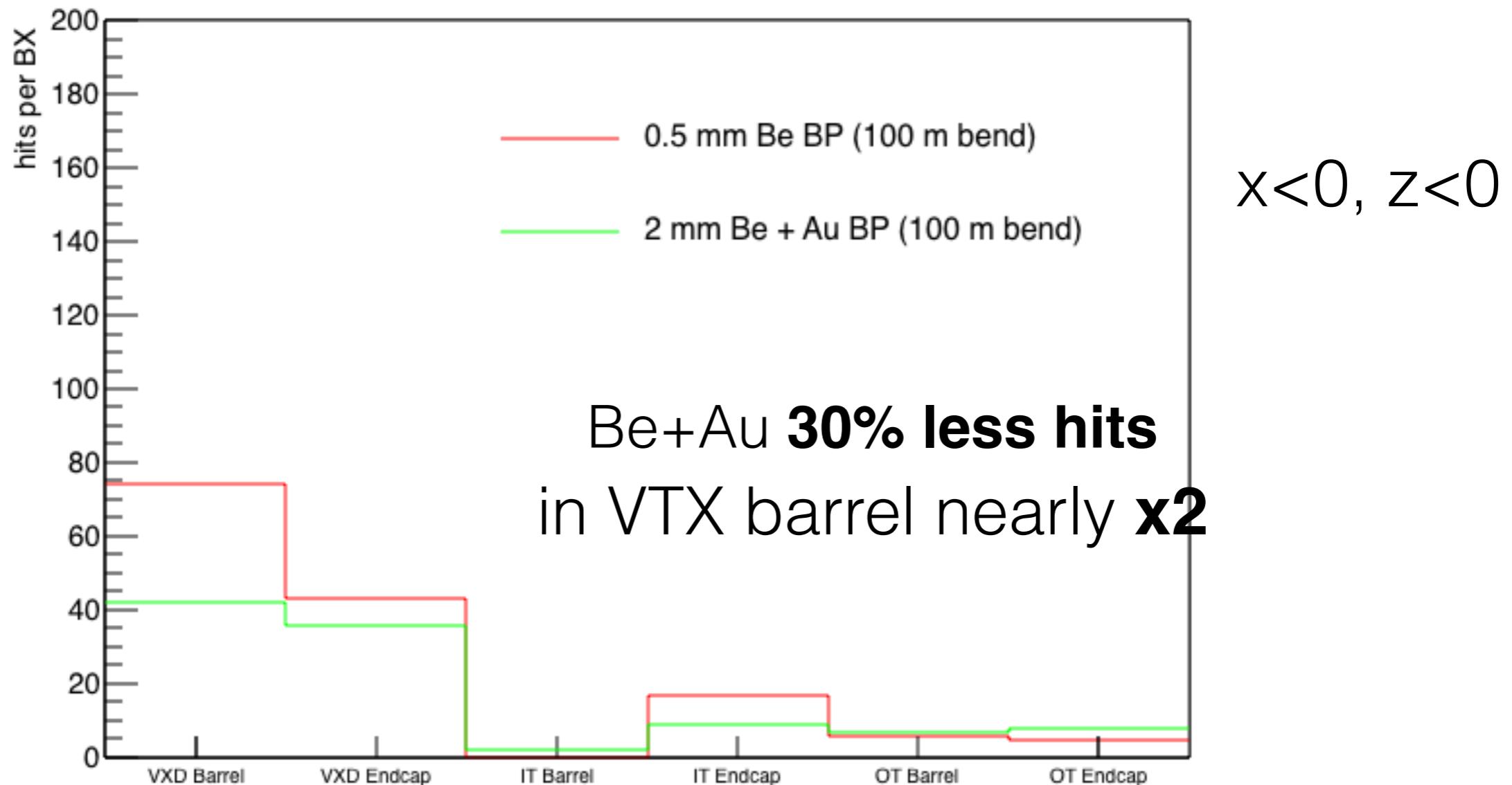
LumiCal



$x < 0, z < 0$

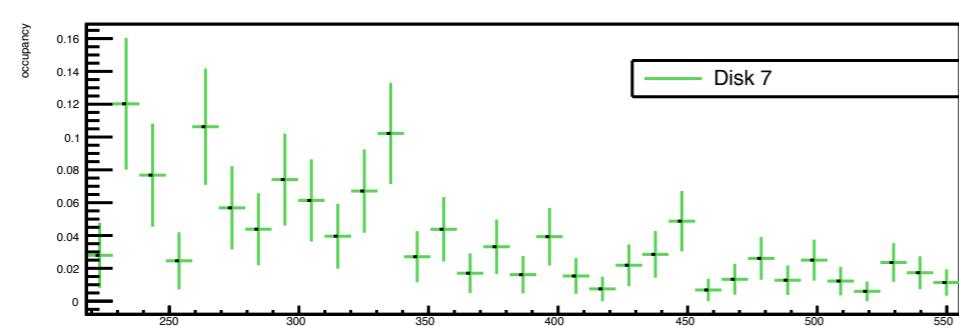
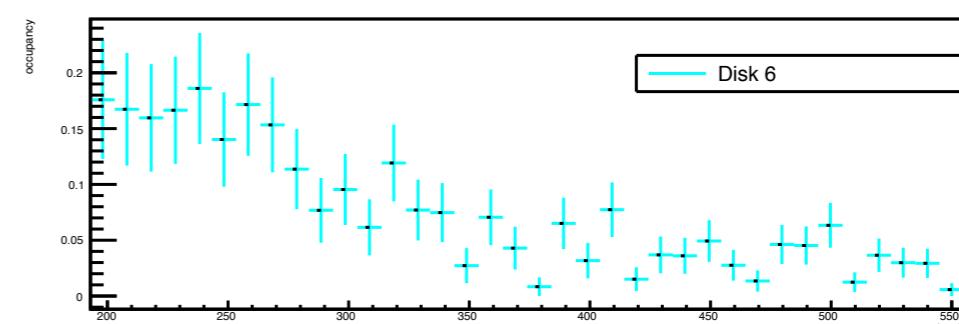
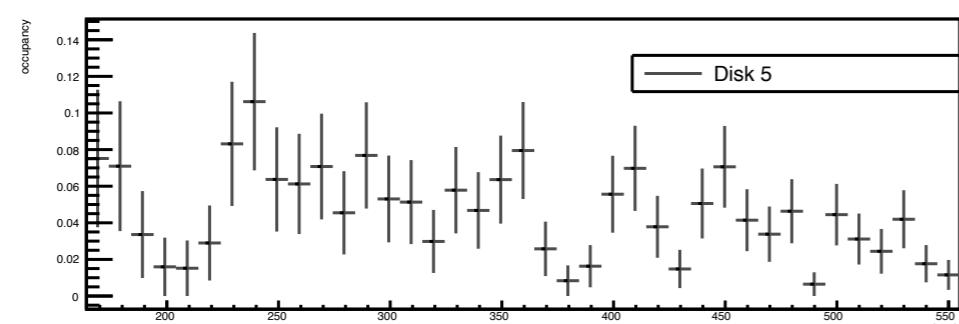
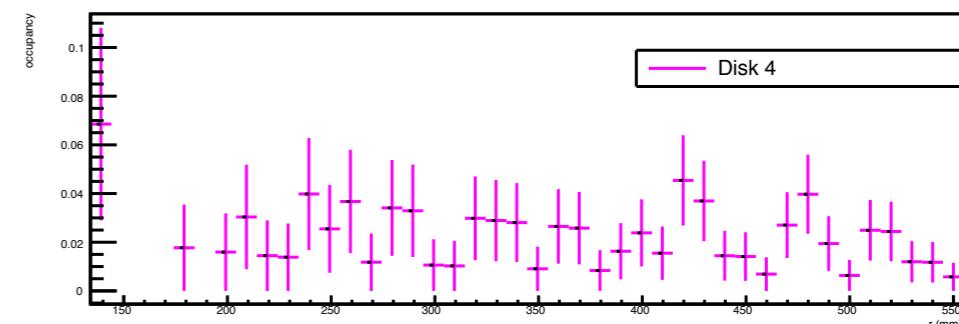
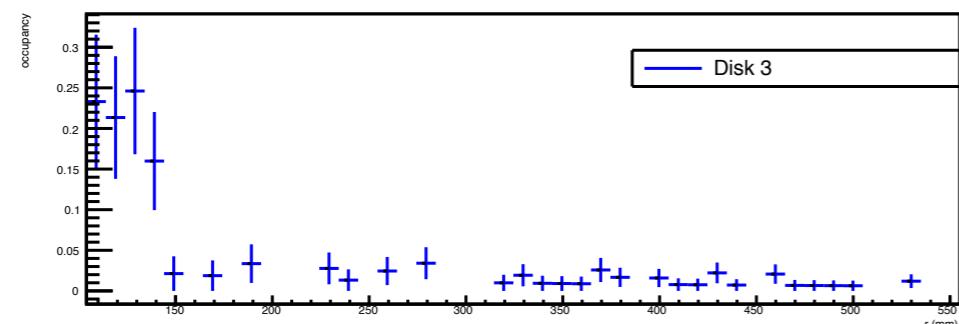
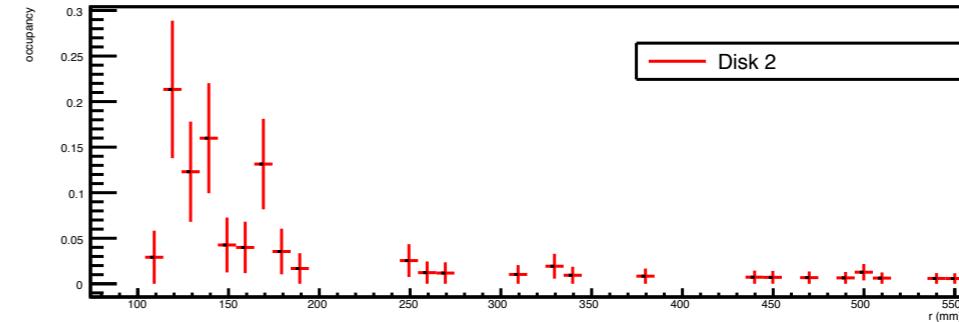
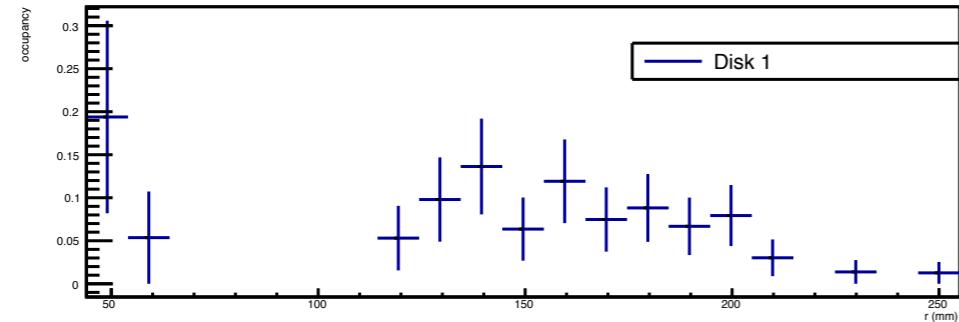
LumiCal shields **VTX detector, 50% less hits**

Beam pipes comparison Be (0.5 mm) vs 2 mm Be+Au (2 mm + 25um)



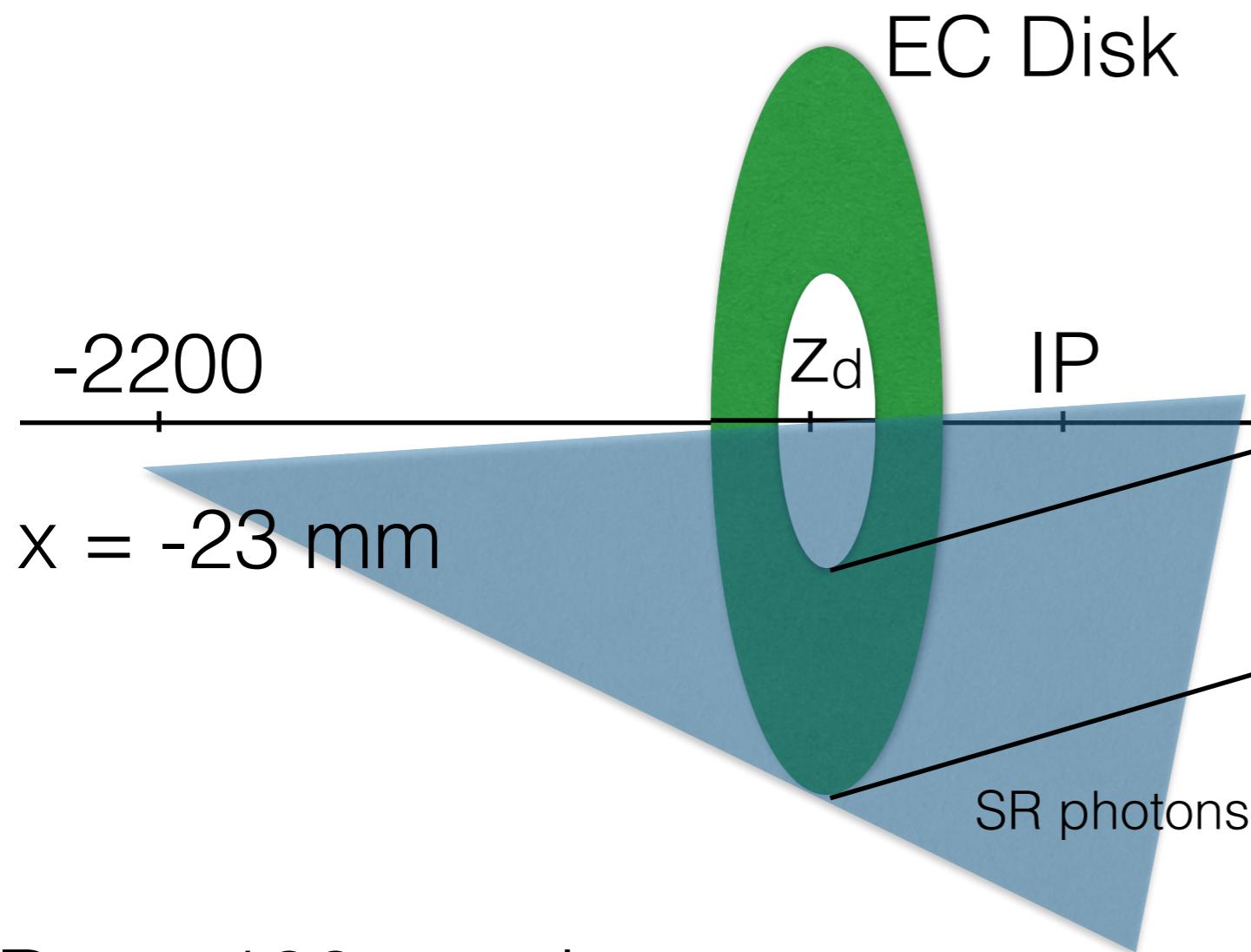
Atm Au layer covers all beam pipes, should be just central region?

@ Understanding Occupancy



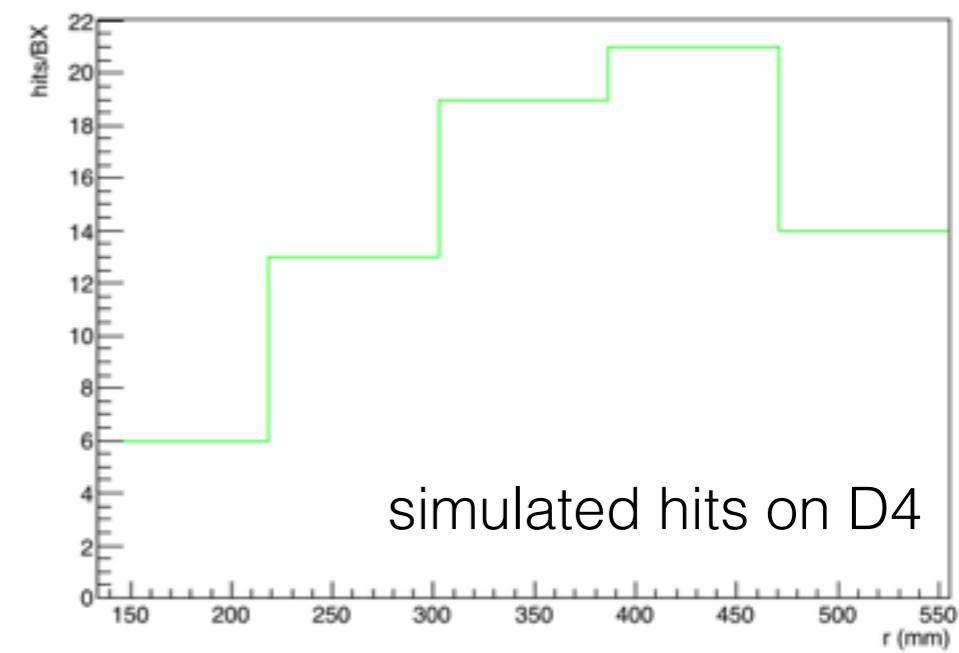
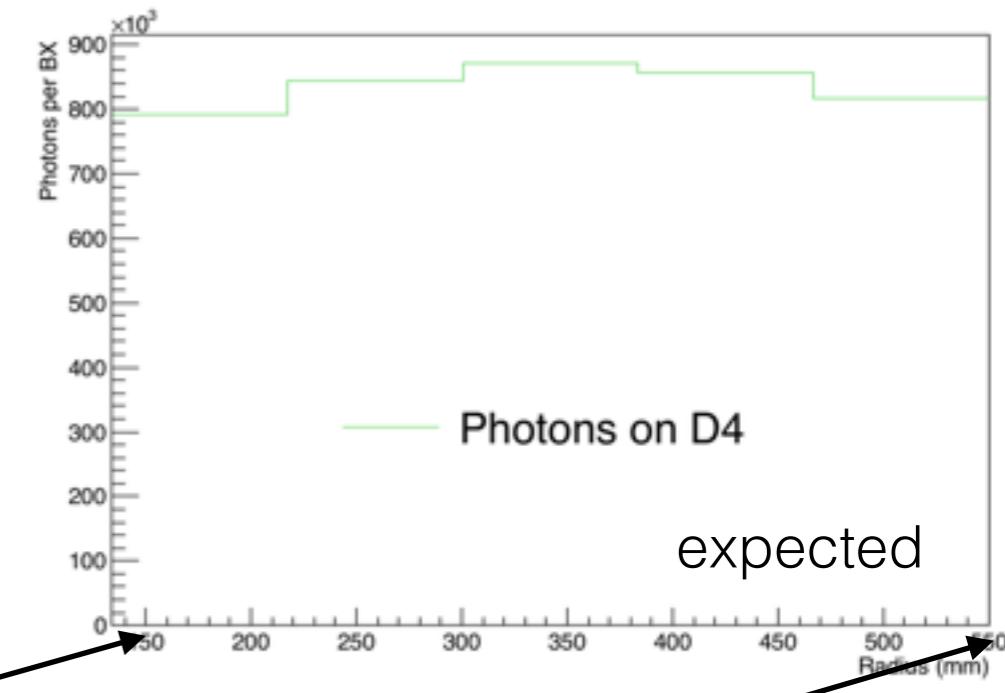
No shield

SR photons on Endcaps

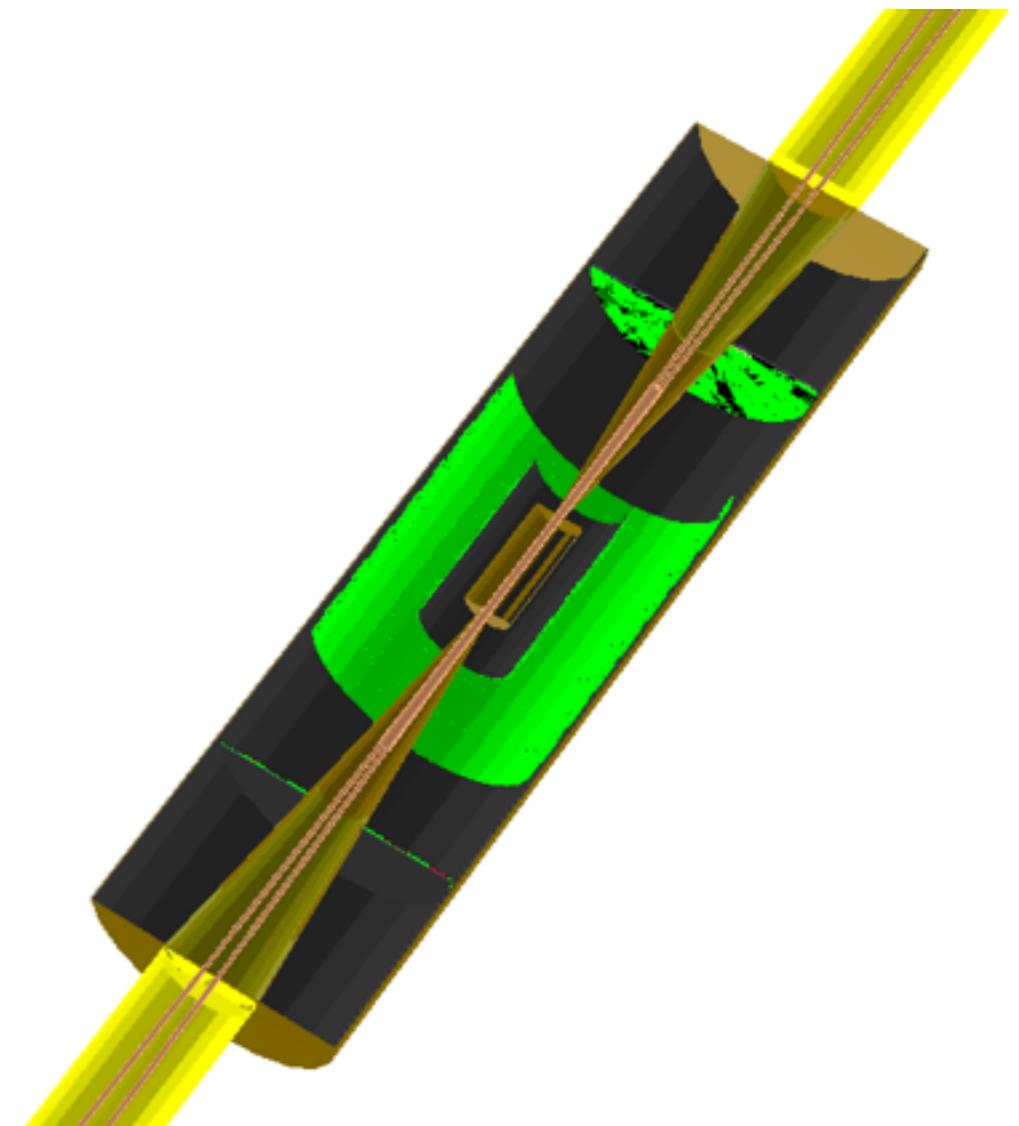


$R_{\min} = 100 \text{ mrad cone}$

$R_{\max} = 555 \text{ mm } (\text{D1 } 250 \text{ mm})$

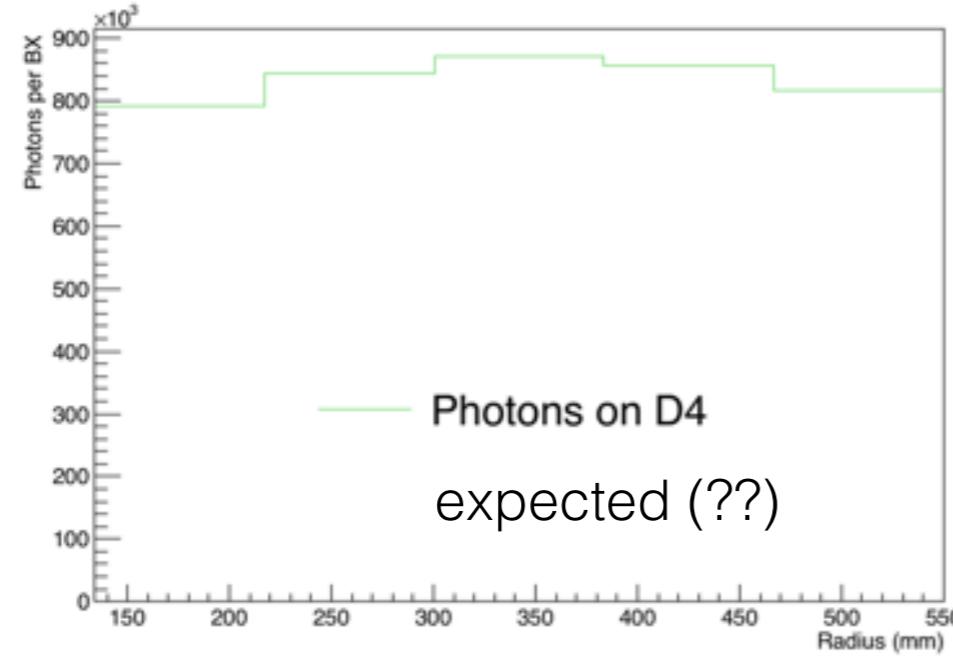


- Energy
- LumiCal
- Run only Disk4 removing other disks and detector parts
- Run Disk 4 only without beam pipe and cones (as at low angles photons will traverse long paths through Be)
- Increase statistics
- **Track back the hits-> ongoing...**

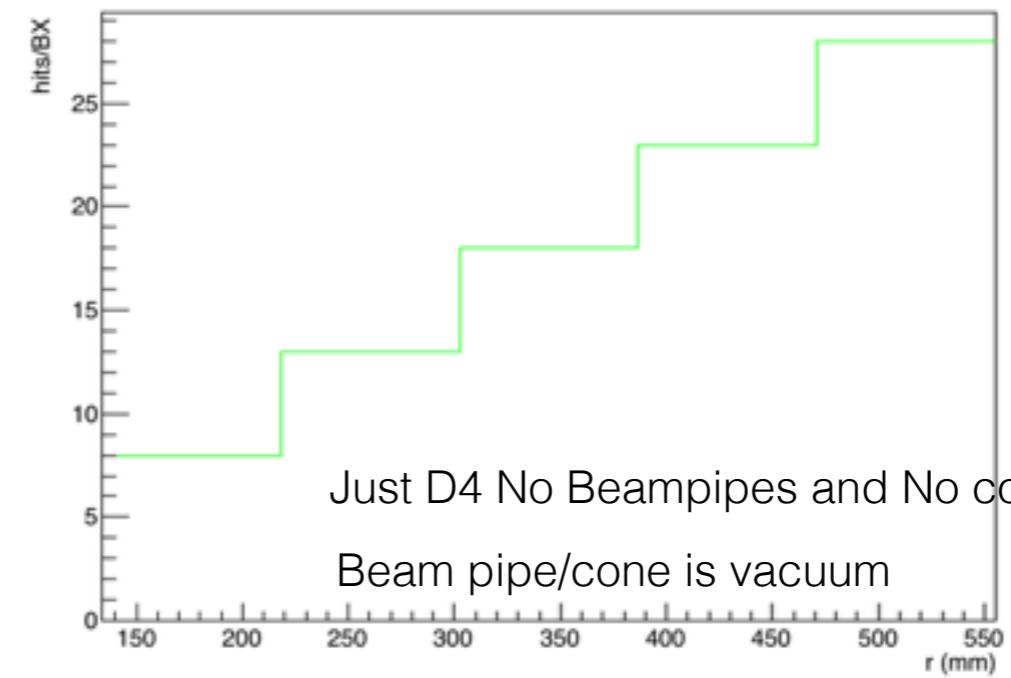
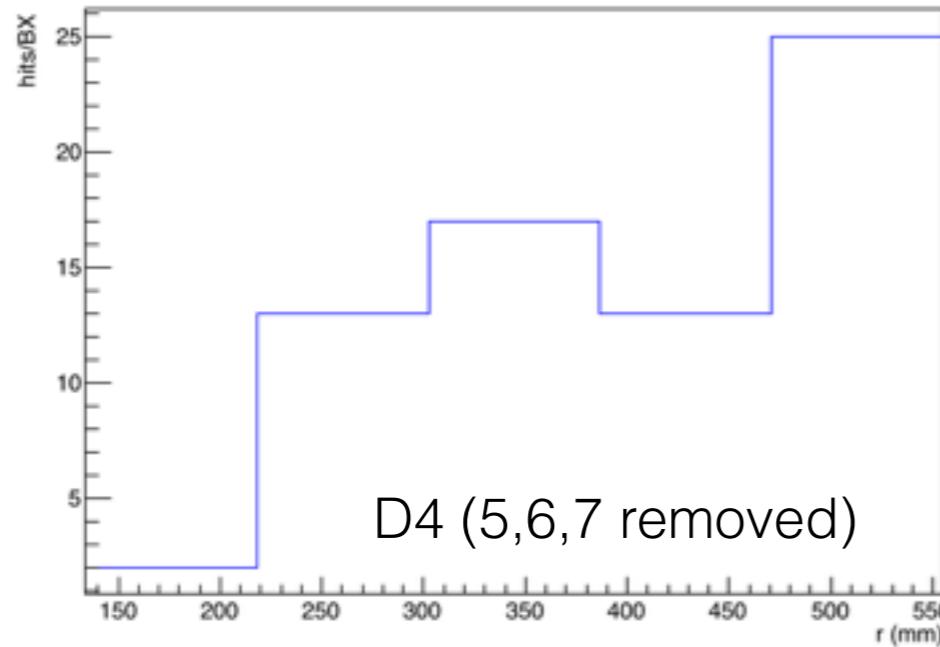
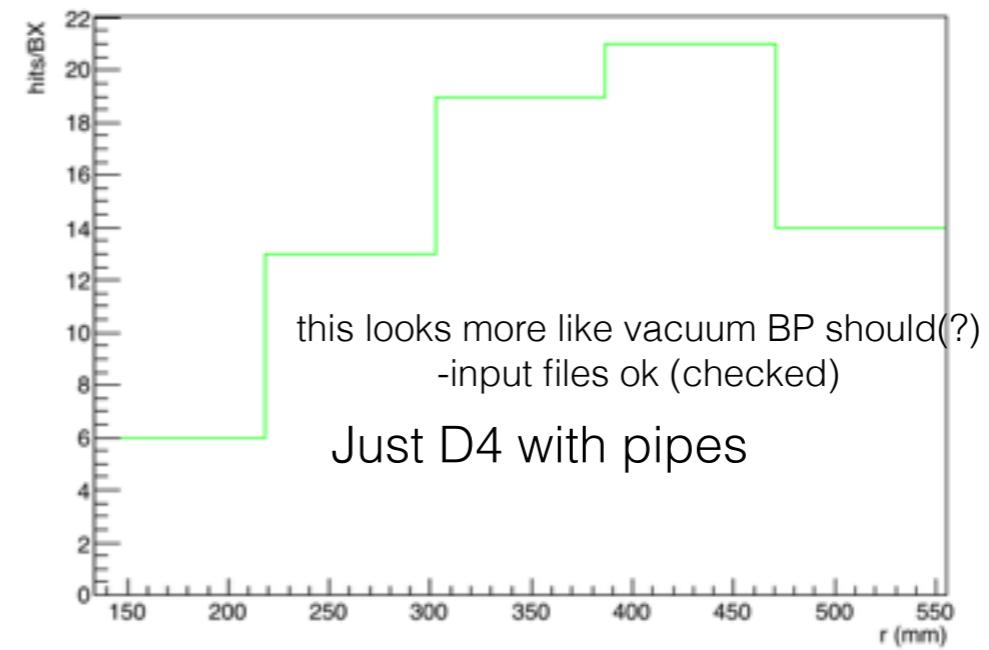


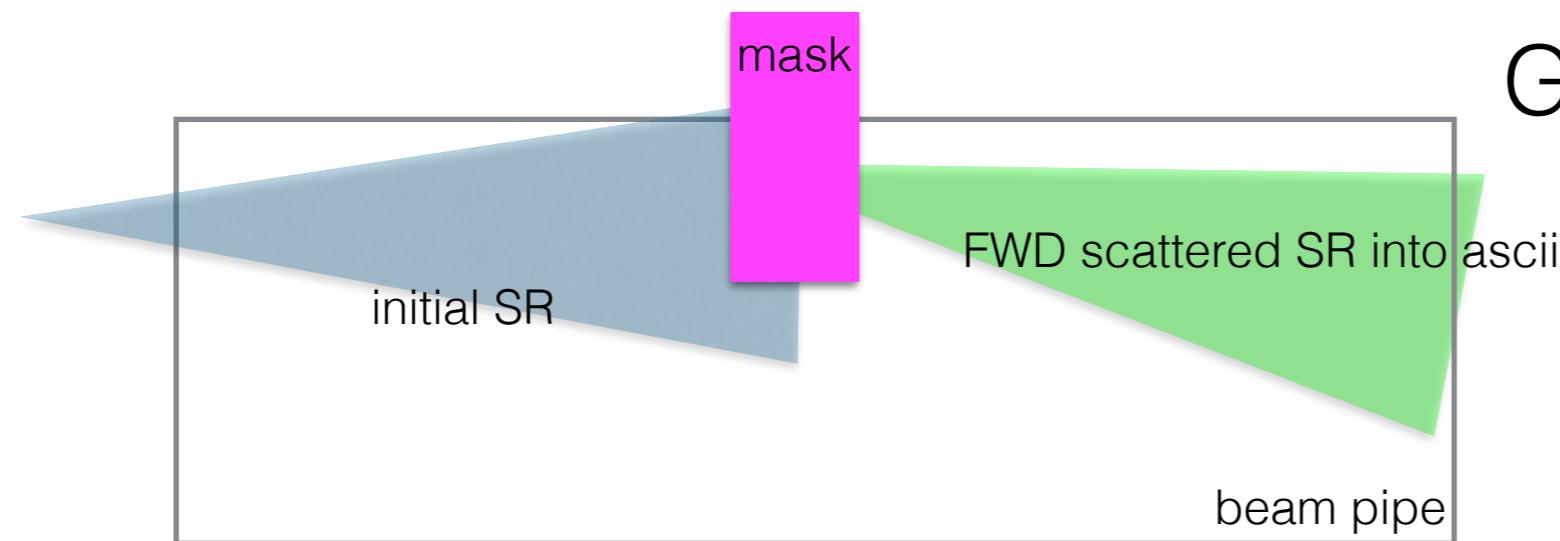
Be BP and cone changed to vacuum

SR photons on Endcaps



?



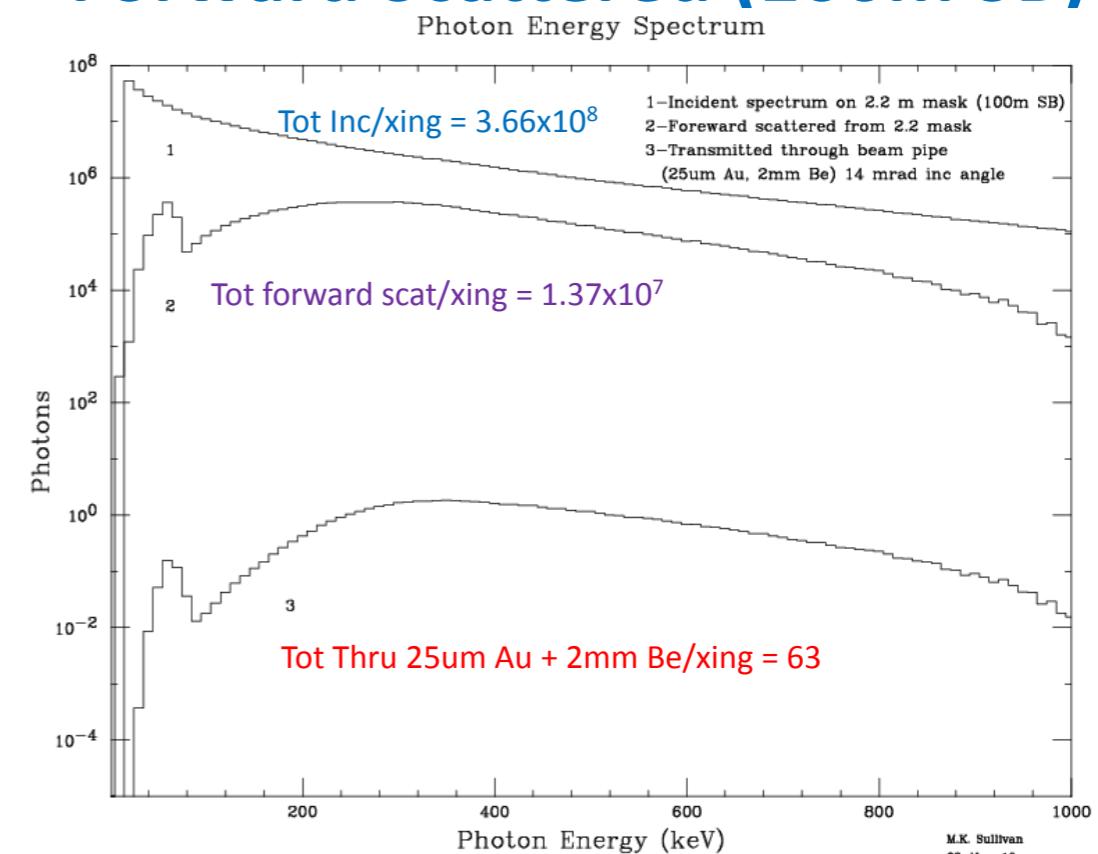


Geant4 model

Generate SB SR spectrum (BX)
-> InvSynFracInt_dist.C (H. Burkhardt)

- Complement M. Sullivan FWD scattered spectrum.
- Good to understand SR in the interaction region and how it changes with moving last bends/quads.

Forward Scattered (100m SB)

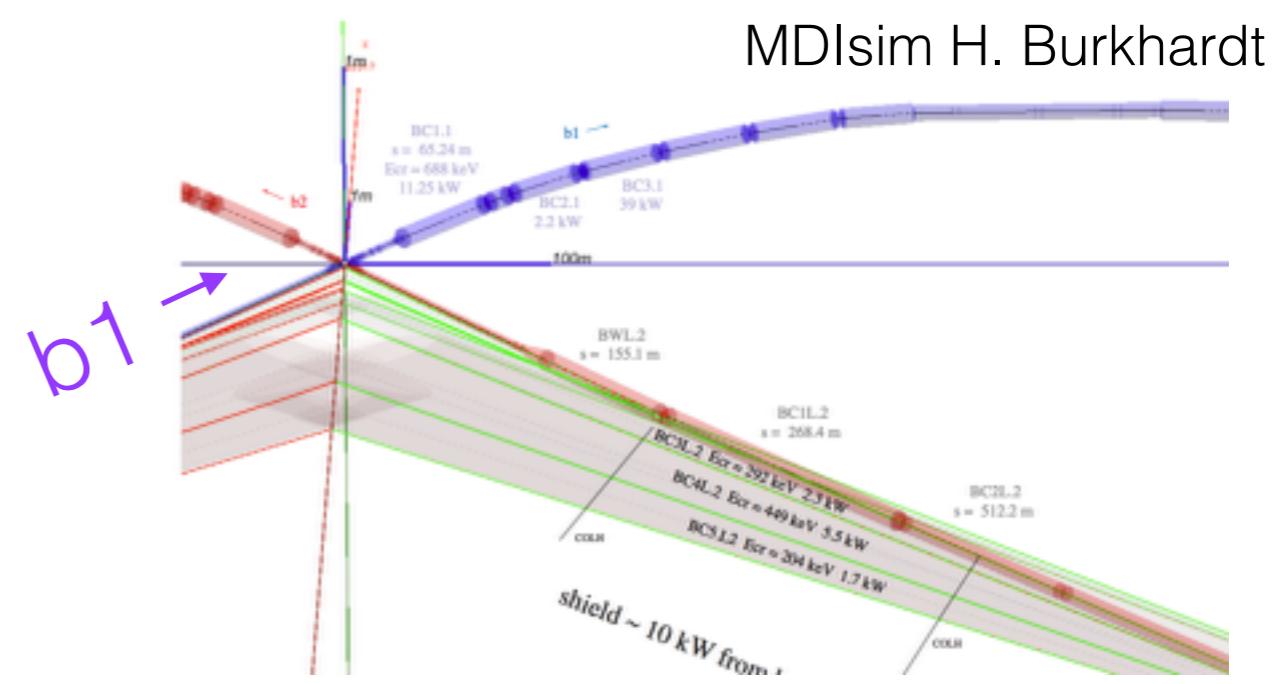
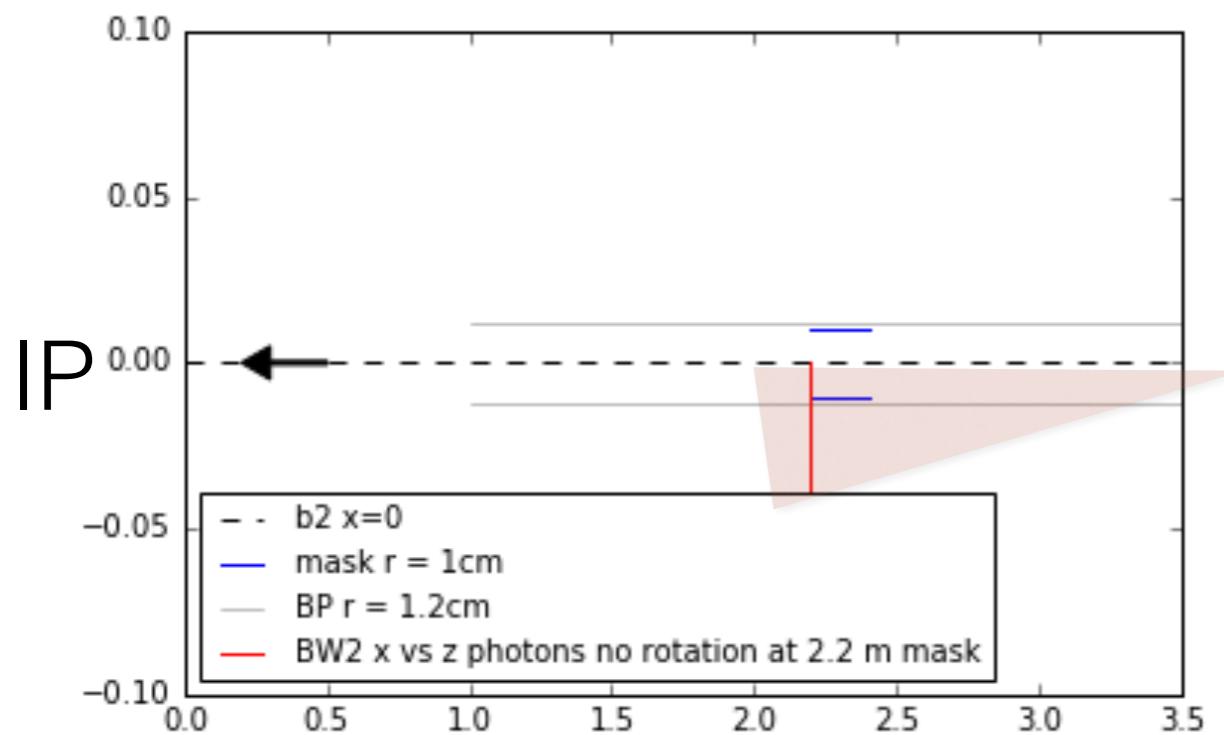
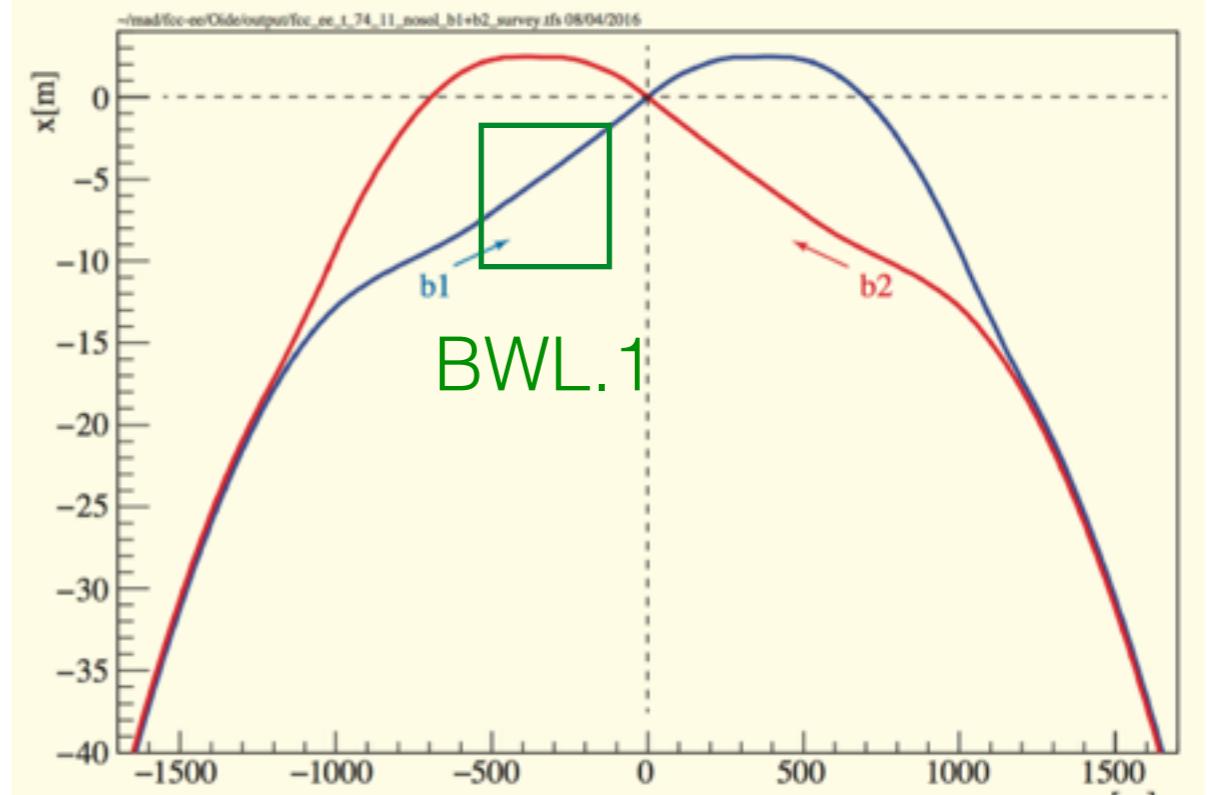


M. Sullivan

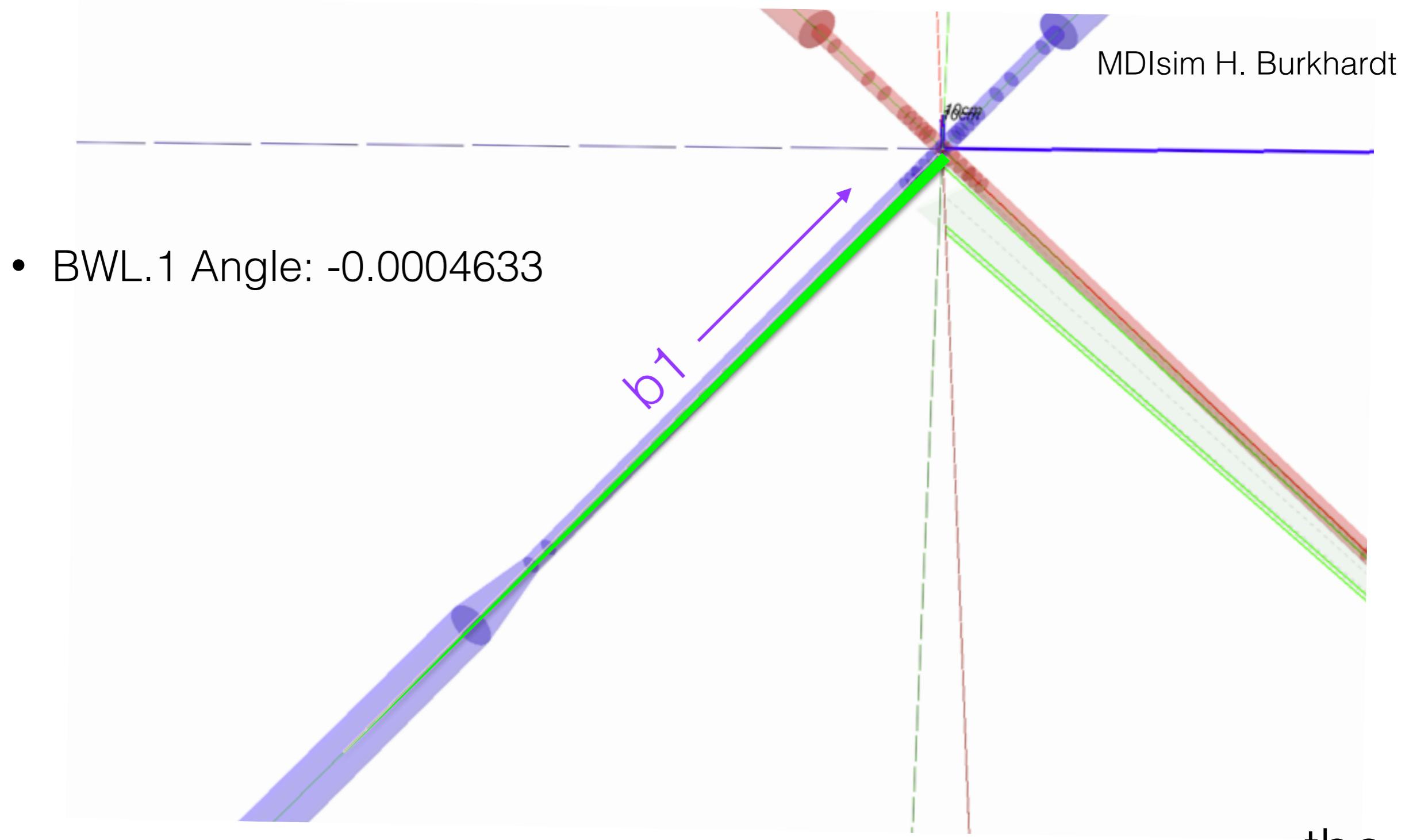
SR cone direction from the last Soft Bend



- SR from BWL.1/2 bends hits the lower mask
- BWL.2 Angle: -0.0004633, $E_c = 99.98$ keV
- Take only photons hitting the mask (FWD scattered)
- how much goes into IP?



SR cone direction from the last Soft Bend



tbc

Comparison of particles going through CBP



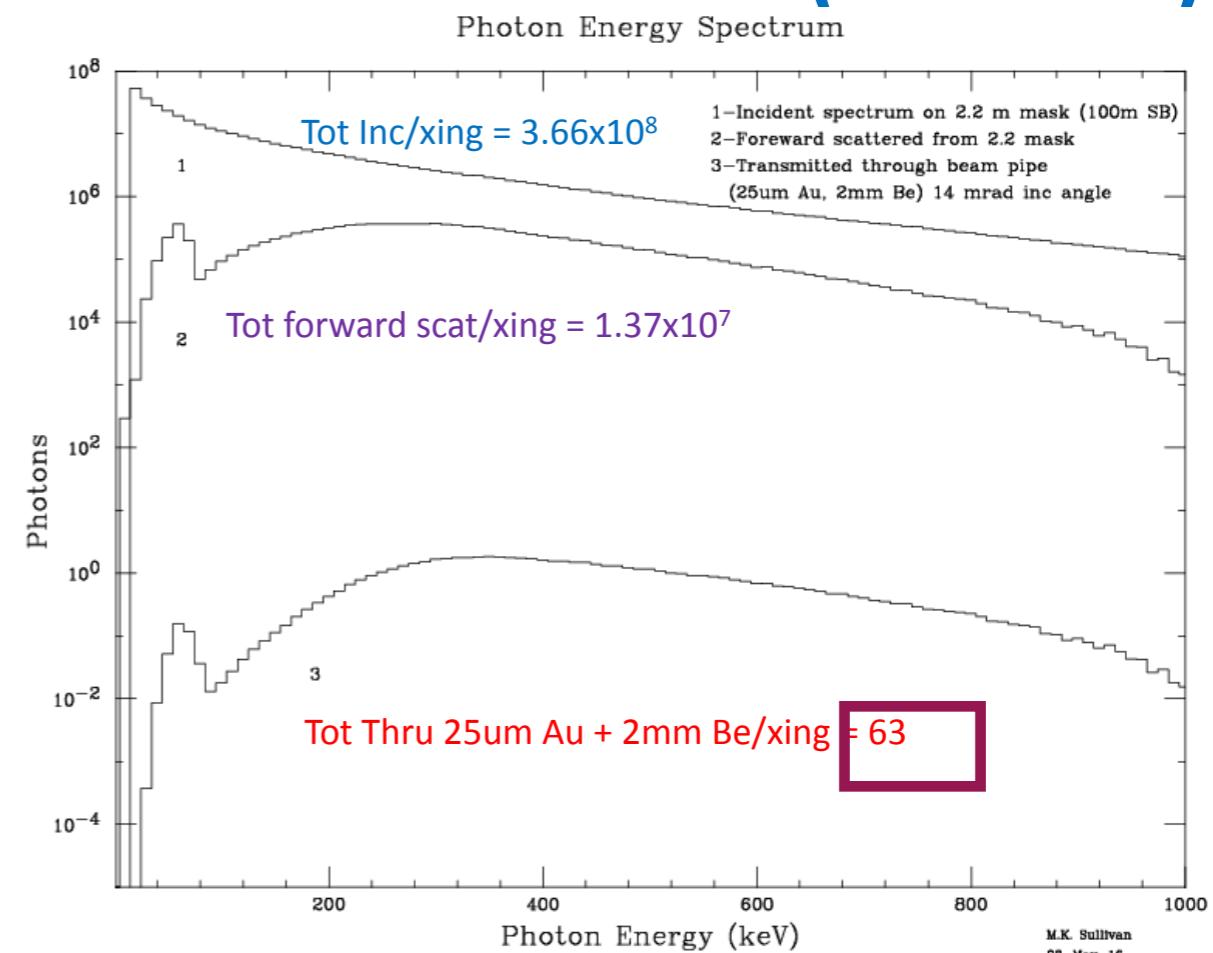
Mikes assumptions:

- 2cm radius +/-50 cm (no cone)
- solid angle acceptance
- on z axis, no crossing angle or off-set
- average angle

Our model:

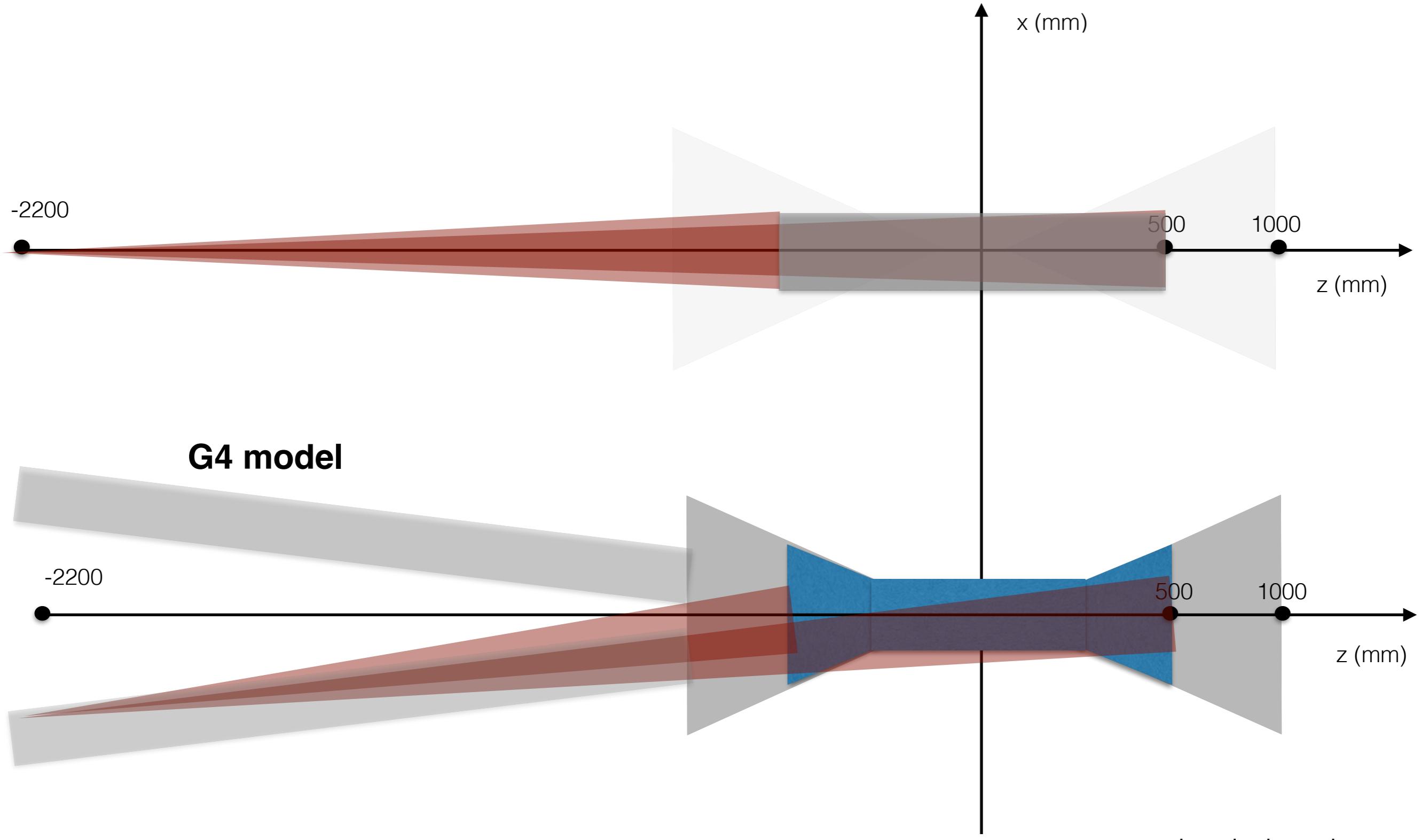
- 2cm radius +/-25 cm + cone
- crossing angle and off-set
- not straightforward to compare
- trajectories not saved in G4 model
- atm looking at photon endpoints
- Add another sensitive layer to G4 model?

Forward Scattered (100m SB)



M. Sullivan

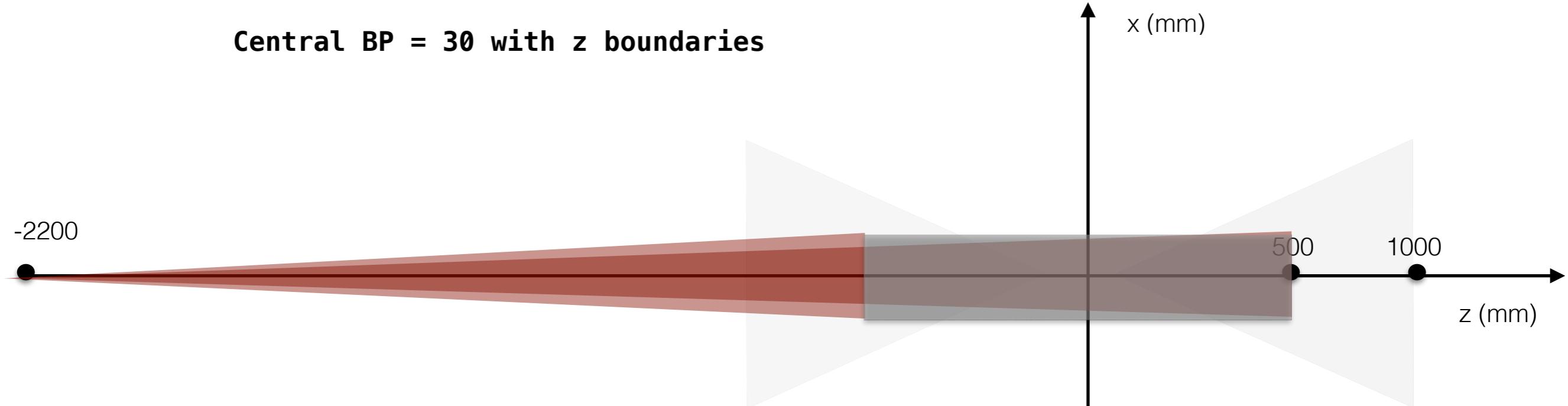
Comparison of particles going through CBP



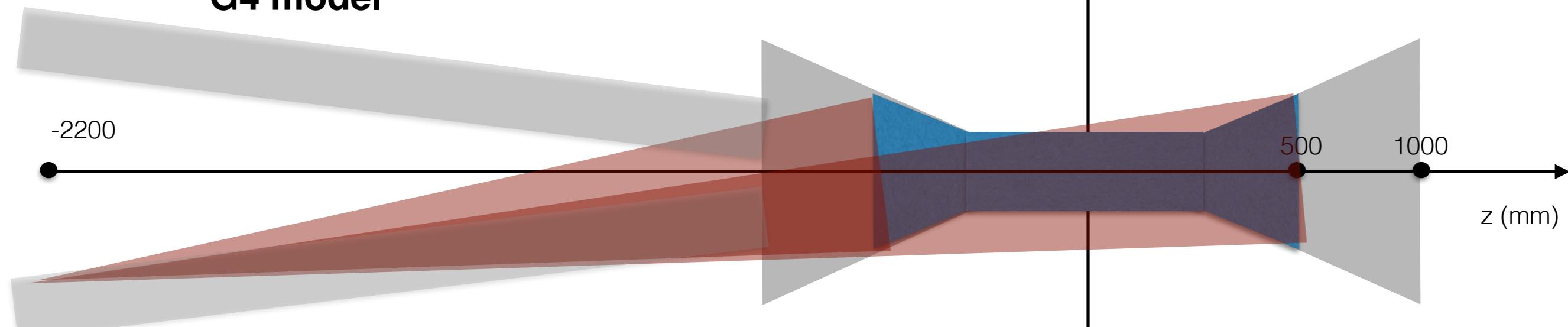
Comparison of particles going through CBP



Central BP = 30 with z boundaries



G4 model



Central BP = 1075 with z boundaries

tbc

- Carry on with occupancy trend
- Geant4 simulations with generated SR spectrum + quads, comparisons etc
- Look at different SR source positions
- Optimal Au layer and BP thickness?