Background Studies - FCC-ee MDI
Progress with MDISim

Simulations without pencil beam

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MDI Study Group Meeting September 22, 2017

Short recap: Possible Collimator Locations

So far: focusing on last two bending magnets: BWL.2 and BC1L.2

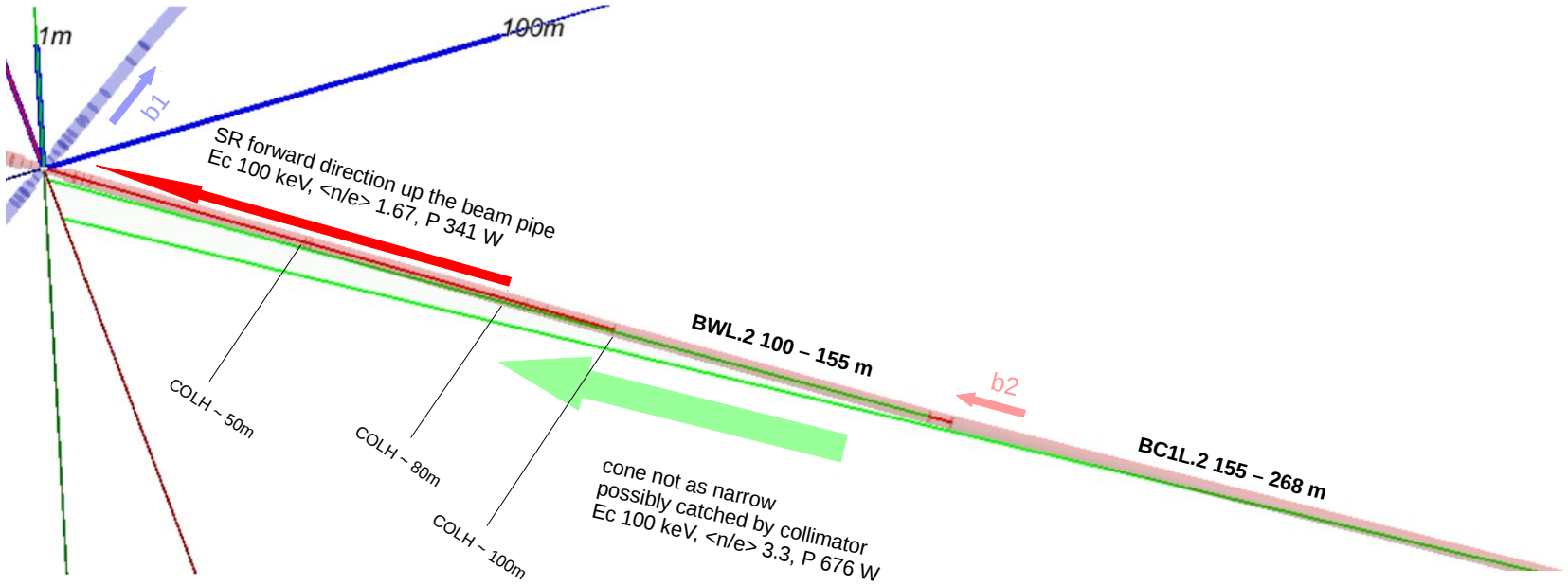
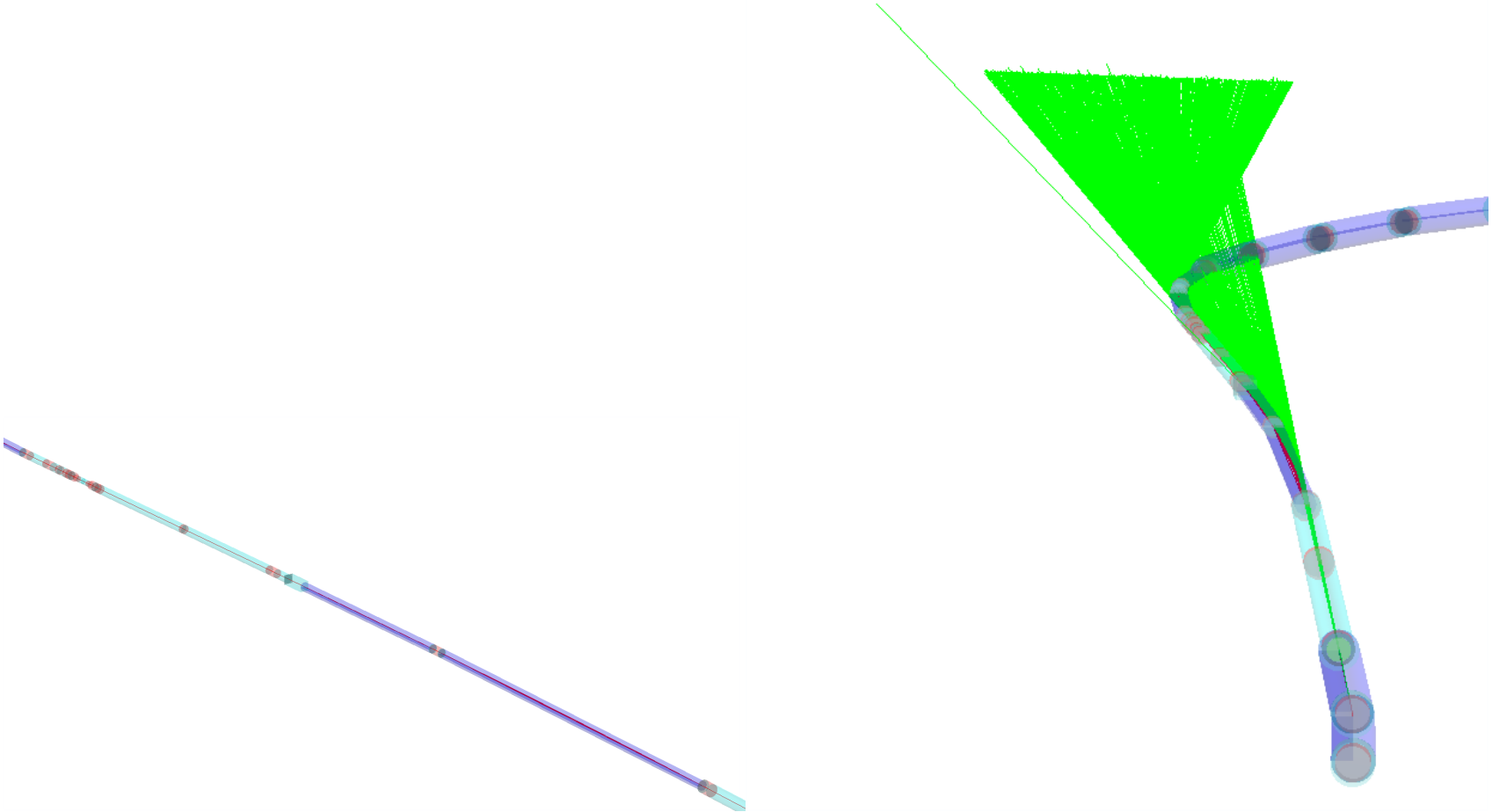


Figure: Possible collimator positions upstream of b2.

- Peak E_c slightly below 100 keV (new lattice; update)
- Protection of IP challenging → SR in narrow cones
- further details: study group meeting in August

b1 and tracking: Primaries and SR fans



(a) (b)

Figure: Part of the primary track and SR fans.

Photon Spectrum: Origin and default distribution

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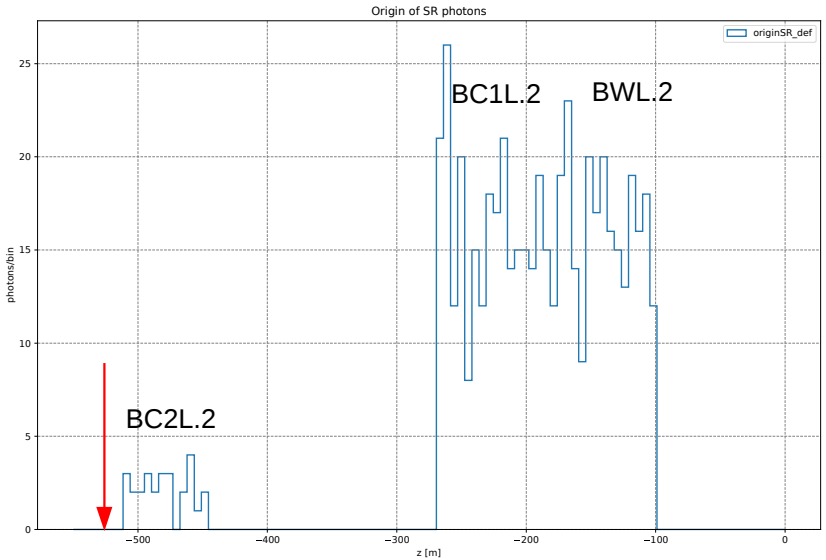
Origin of SR photons: bends



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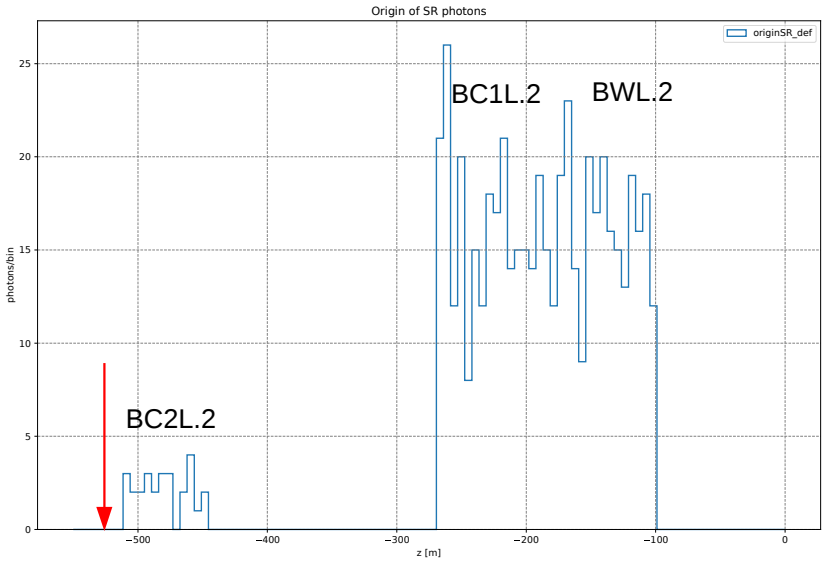
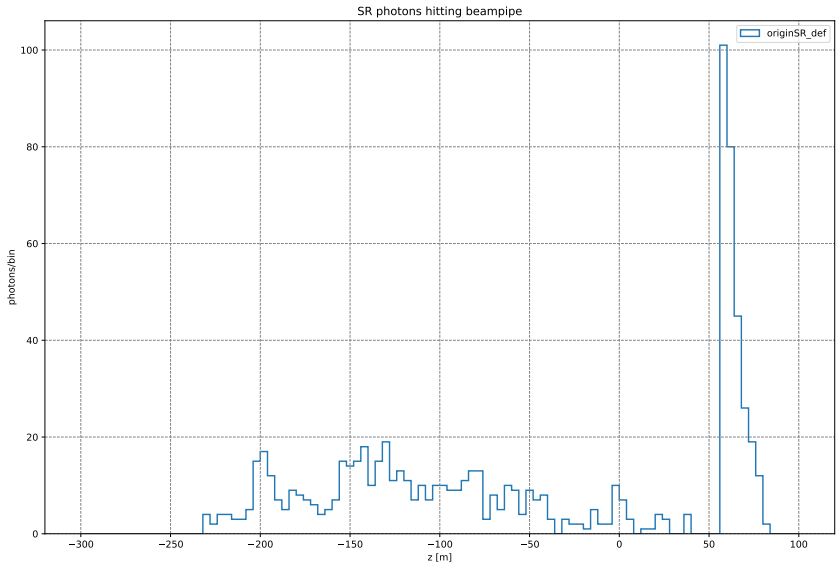


Hits of SR photons at certain locations along z



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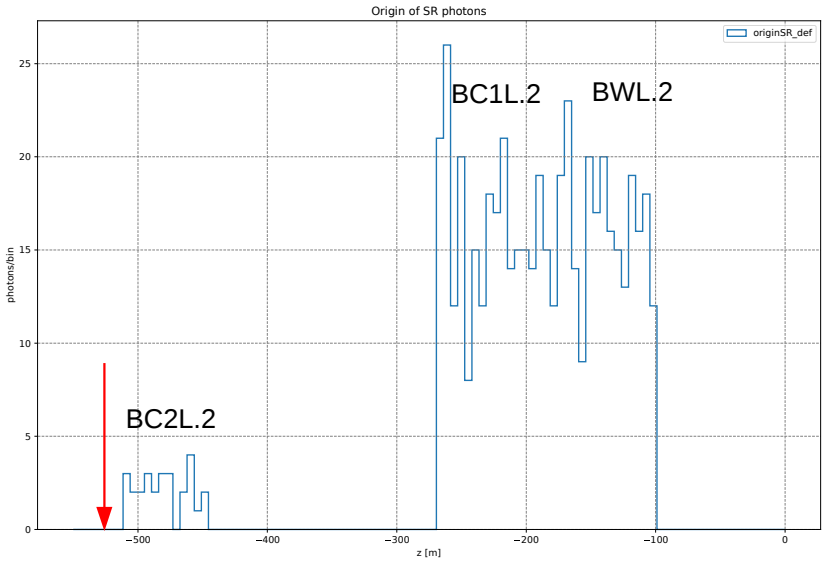

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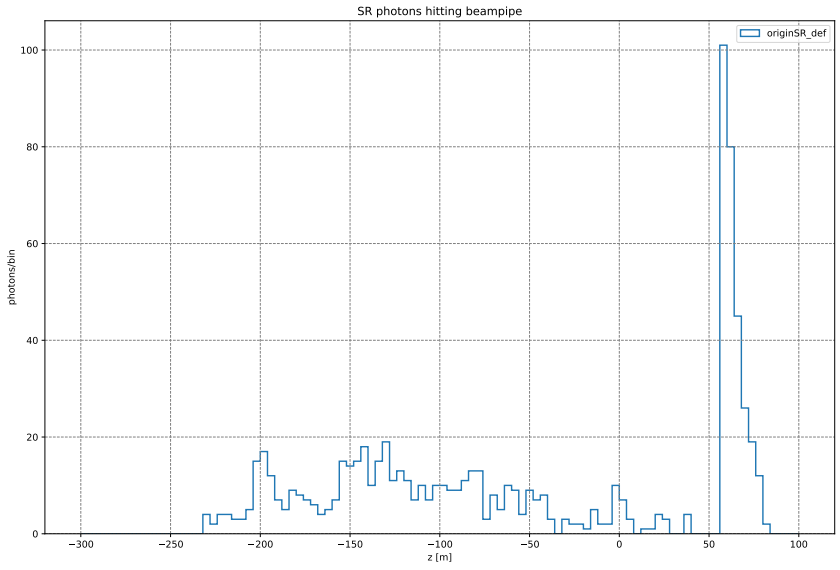

What about Quadrupoles?

More realistic particle distributions

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Currently established four shapes:

1. pencil beam `Gaussx,Gaussy~0`
2. Gaussian `Gaussx,Gaussy~1`
3. flat `Gaussx,Gaussy~N`
4. ring `Gaussx,Gaussy~-N`

→ N specifies how many σ in phase space

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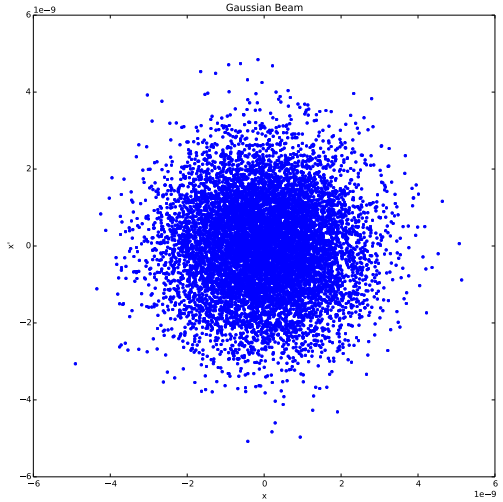

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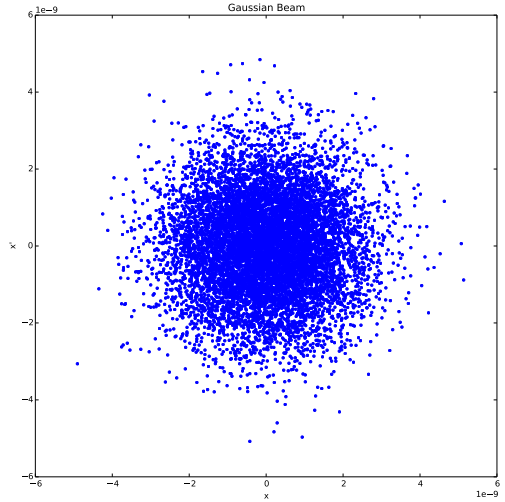

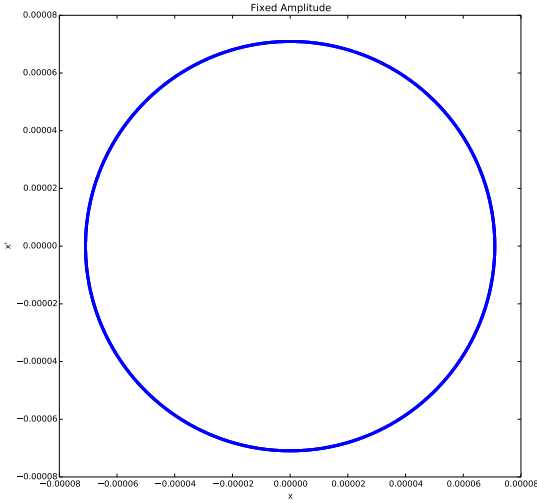

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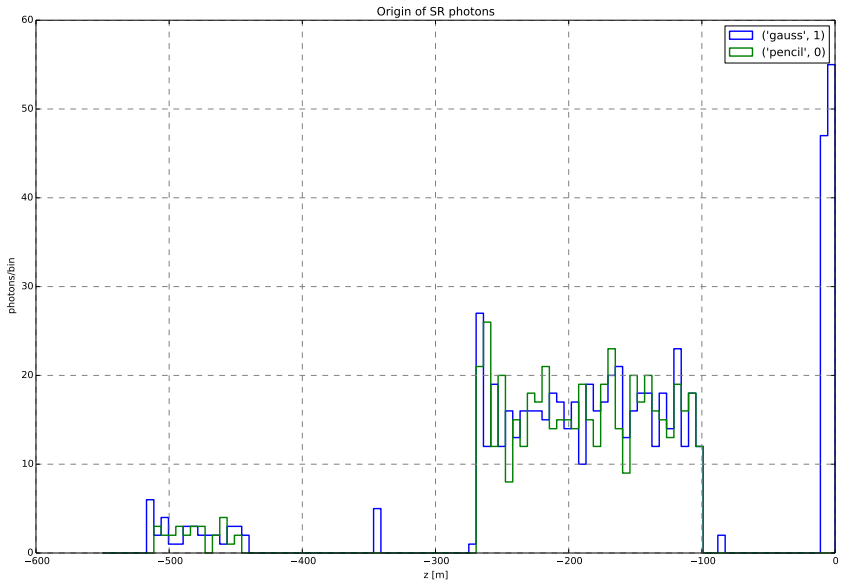
pencil beam vs. Gaussian



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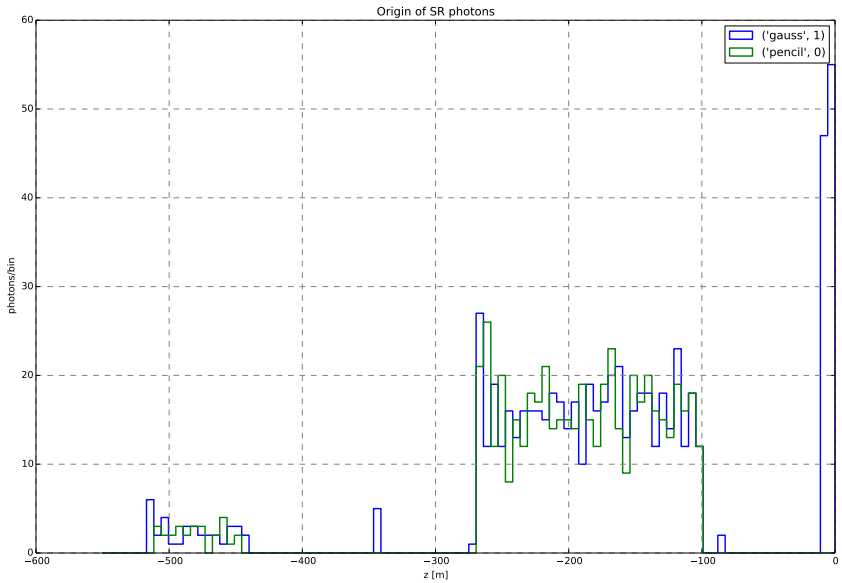
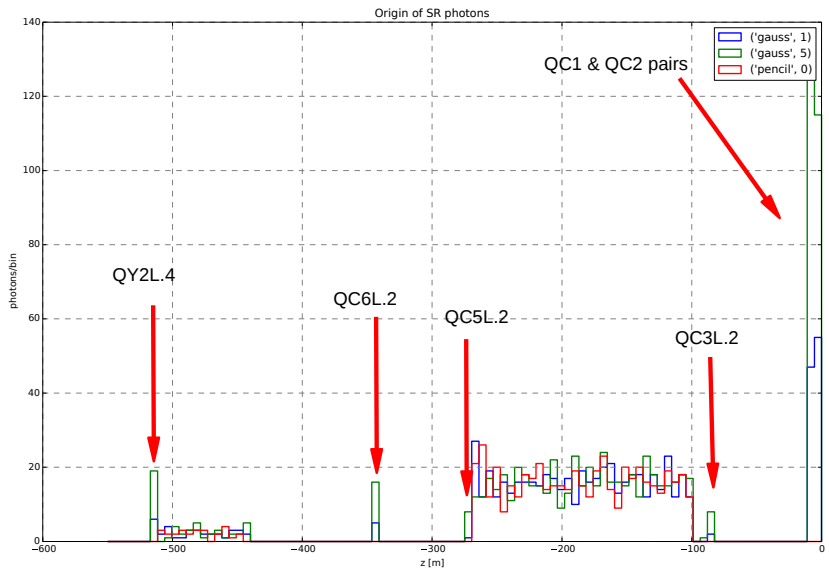


pencil beam vs. flat 5



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Putting all particles at 10σ

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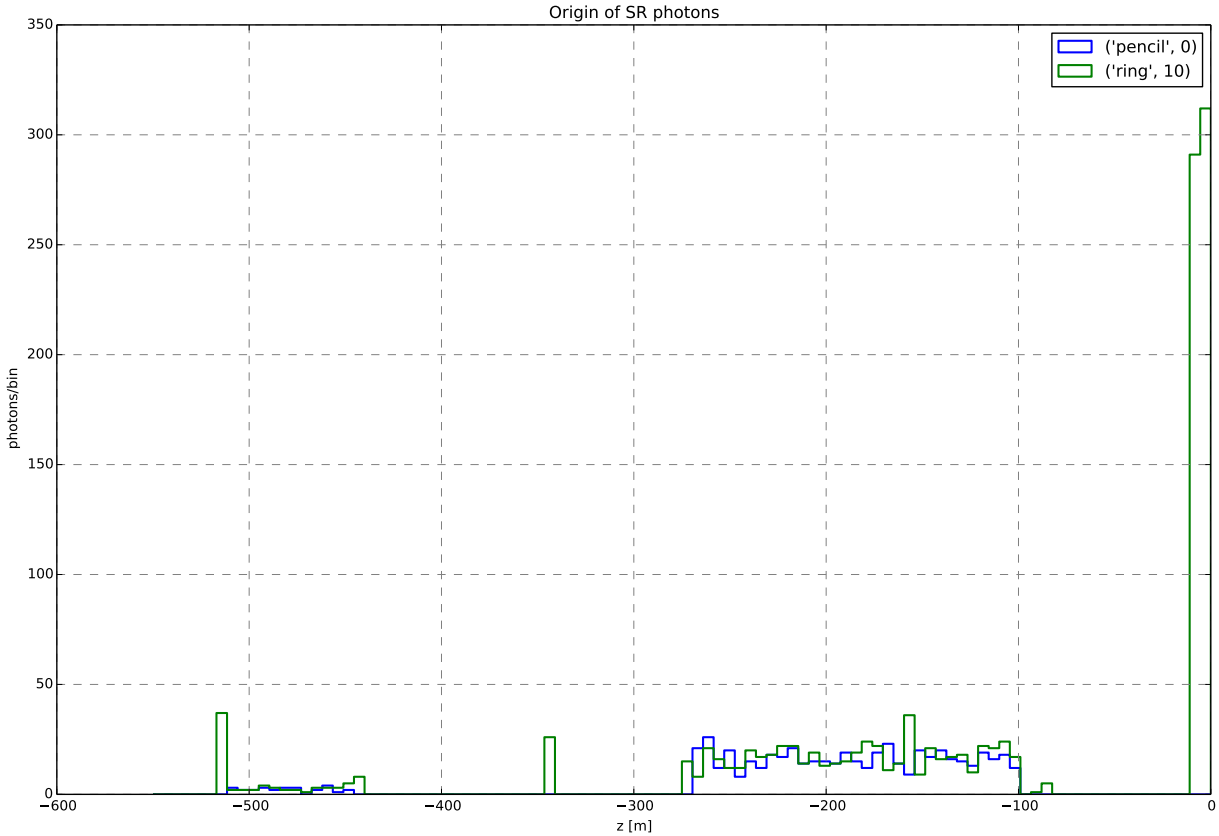

Figure: ring-like shape with N = 10

Hits on BP also affected

Comparing default with new spectrum

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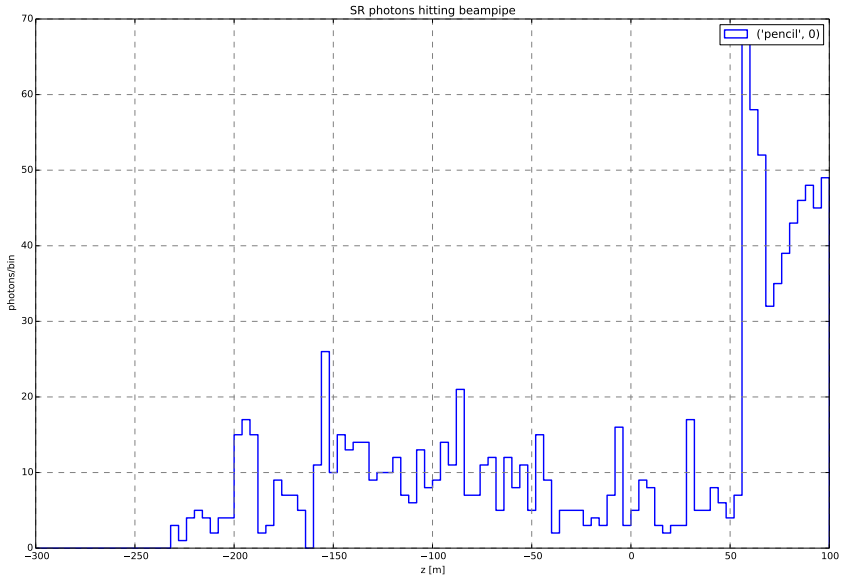
Hits caused by pencil beam



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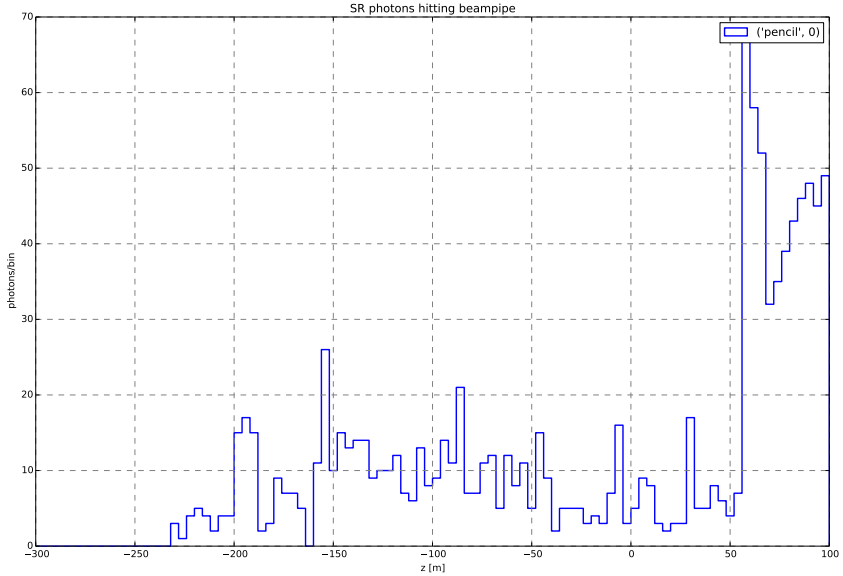
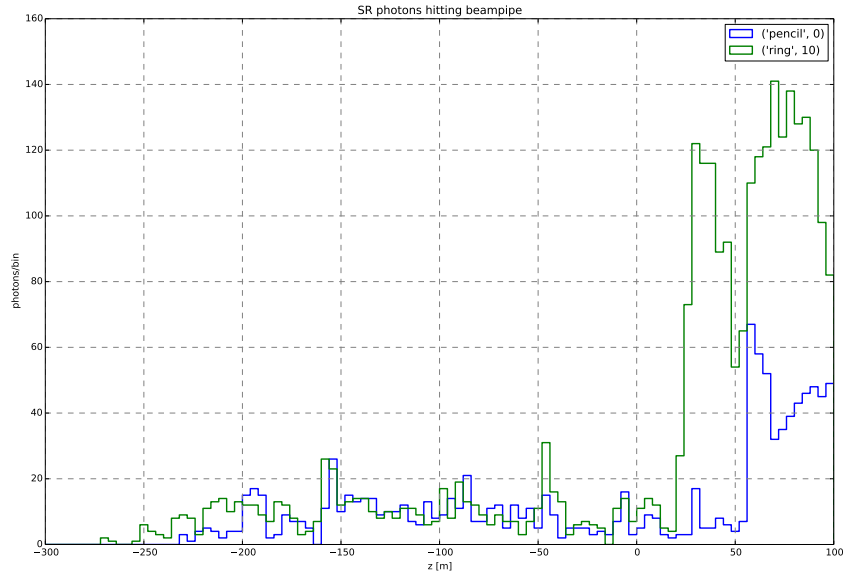


Hits with different beam shape



Outlook: Next steps

- better understand particle distribution
- offset beam w.r.t reference axis $\rightarrow$ MDISim
- study energy spectrum in detail (esp. quads)
- switch to latest optics
- further work on collimators; COLH and COLV?
- estimates at certain points along z

Backup slides

References