Study of Photon Tagging

Electron downstream (Four Quads)

1/ Generate electron track w.r.t its momentum with angle spread :

Theta =0.74 mrad, uniform

VTX(0.,0, -40.3cm) w.r.t inner Solenoid

2/ An example: Tracking event-display. 50event samples.

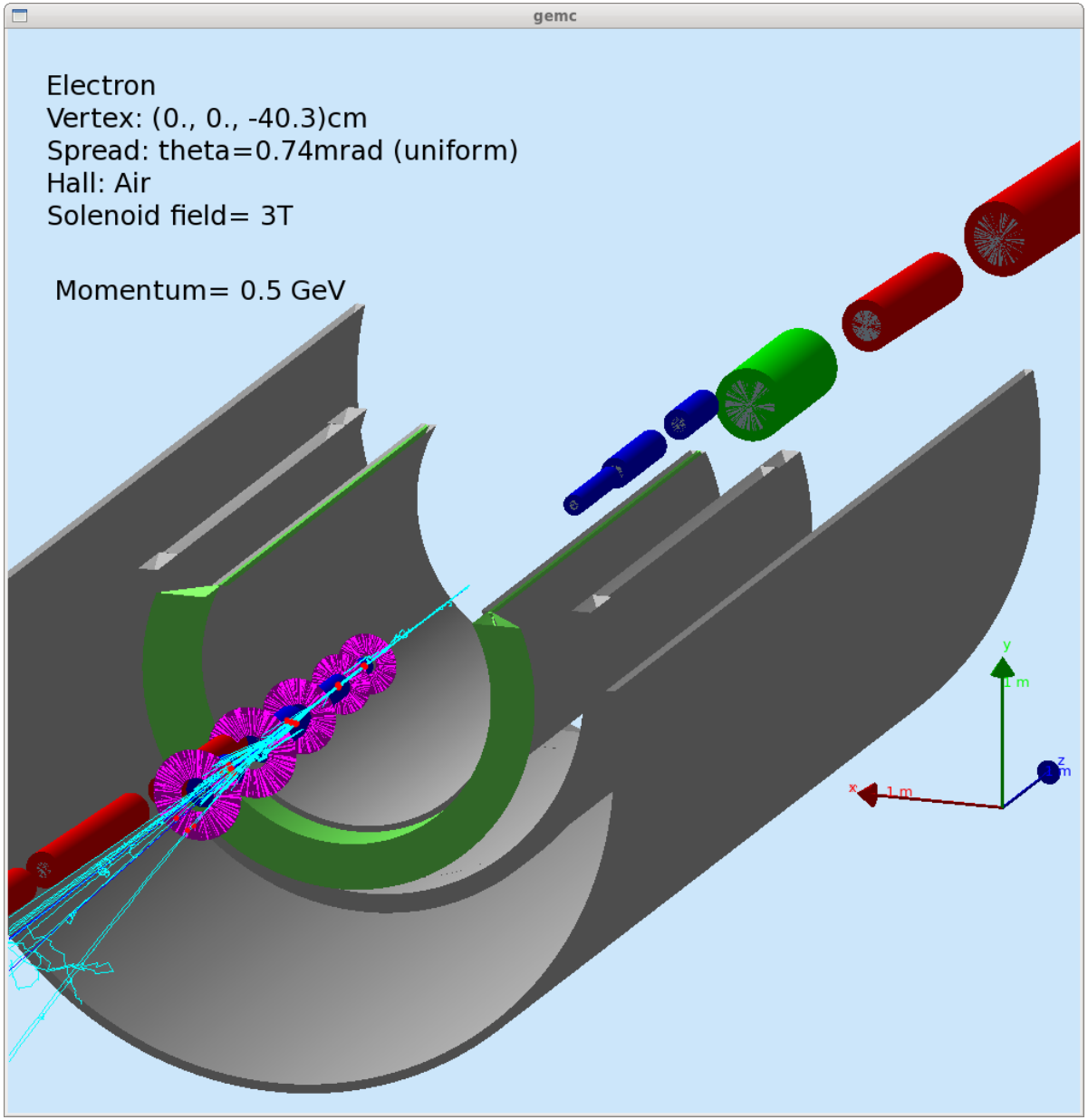
3/ A nominal electron energy(k) = 5GeV

Right plot p_e ***= 0.1 * k = 0.5 GeV/c***

4/ Purple donut shape disk :

virtual detector

NO BEAMPIPE, HALL WITH AIR



Virtual disk: detector electron outside of Quads (inner radius detector is same size of outer radius of each magnet.

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Right plot p_e ***= 0.2 * k = 1. GeV/c***

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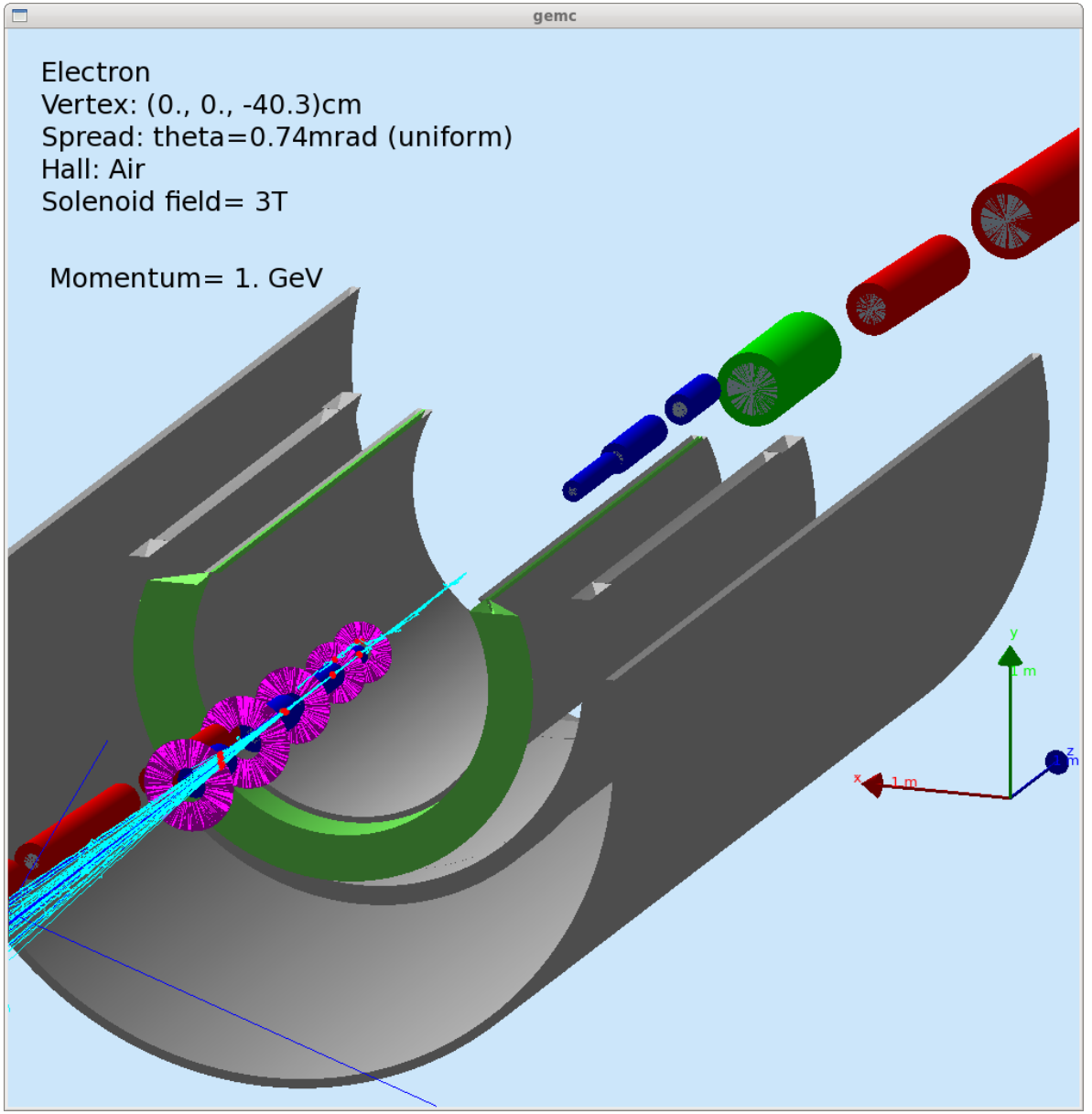
NO BEAMPIPE, HALL WITH AIR



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Right plot p_e ***= 0.4 * k = 2. GeV/c***

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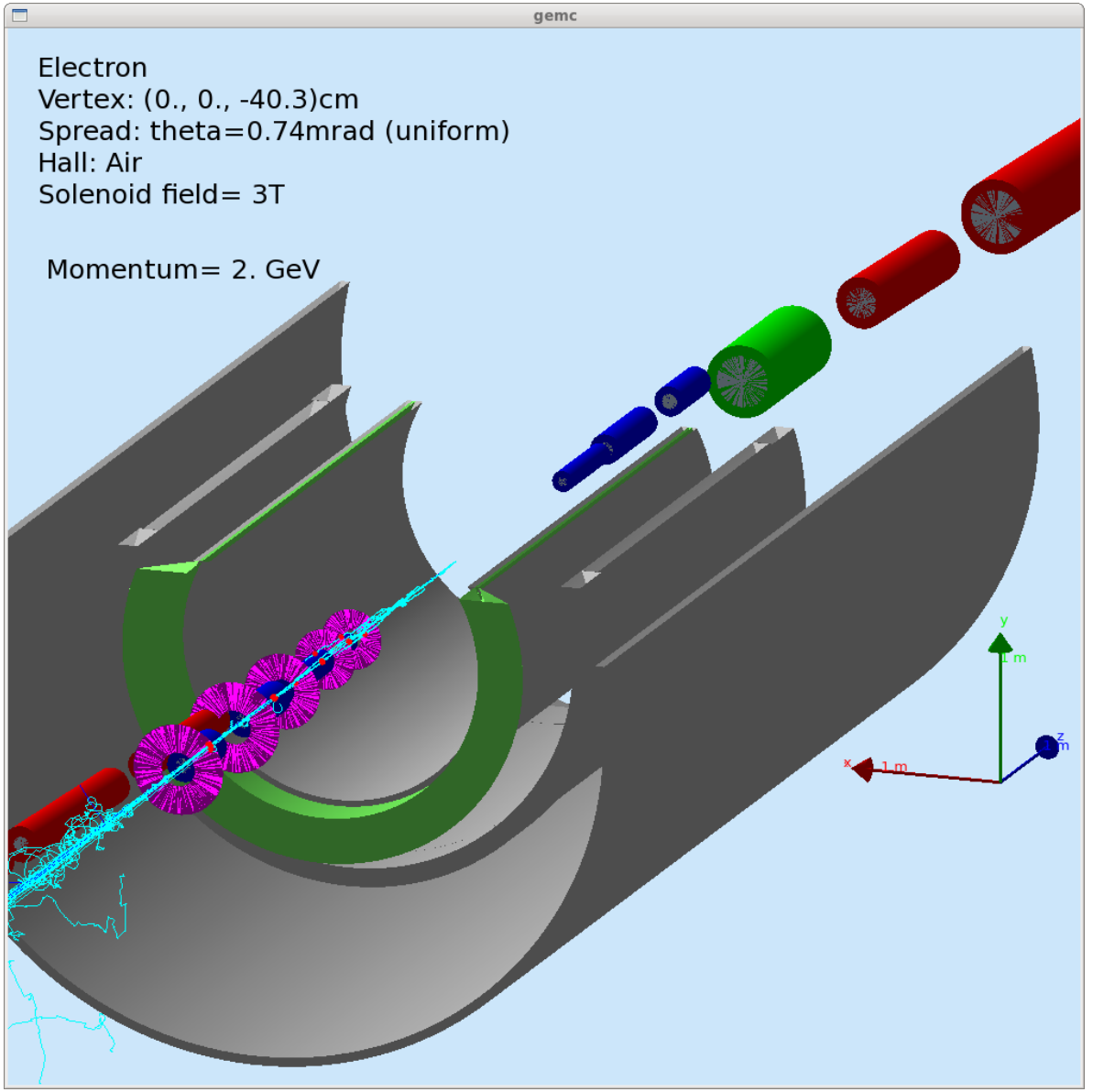

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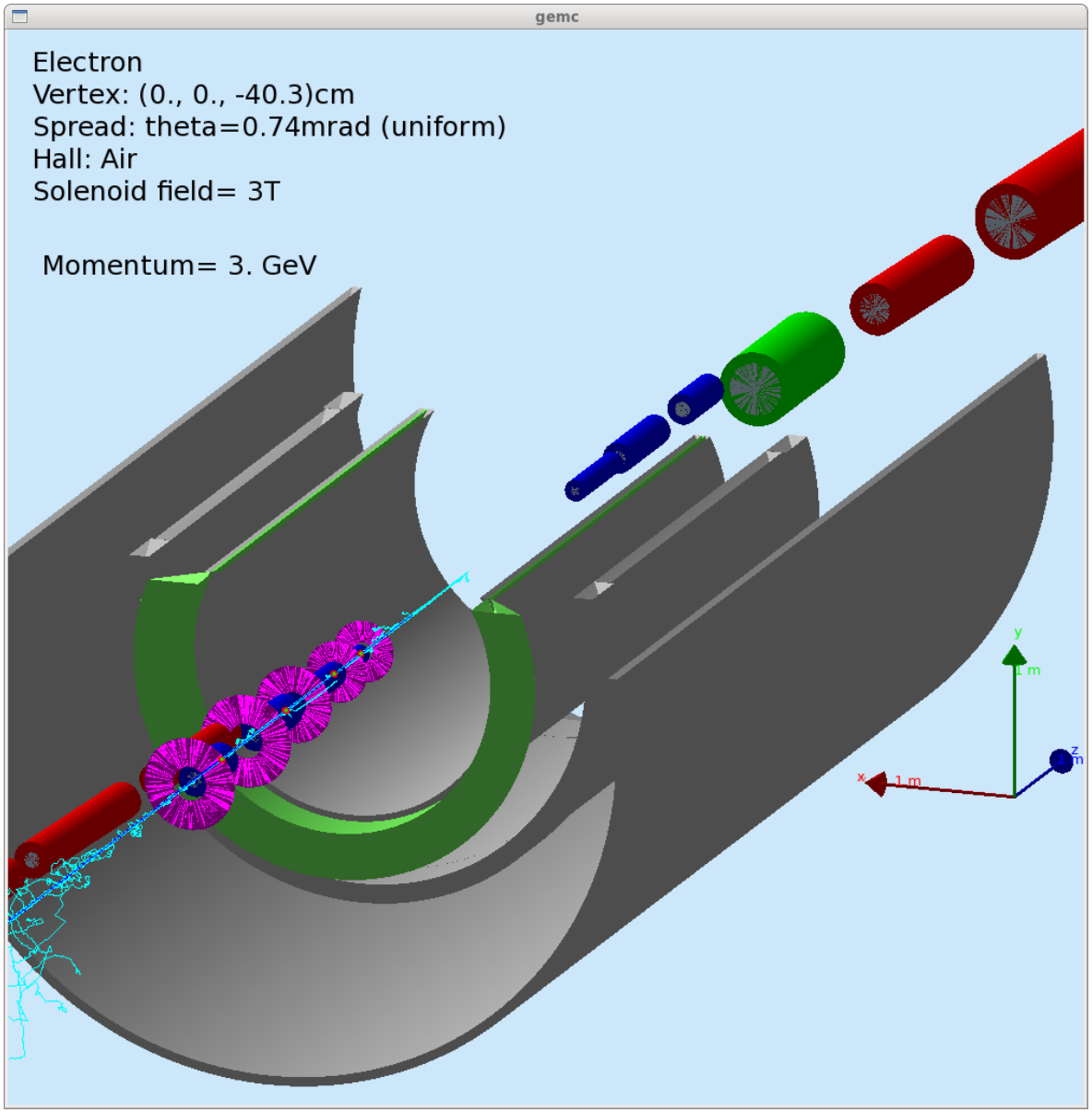
Right plot p_e ***= 0.6 * k = 3. GeV/c***

4/ Purple donut shape disk :

virtual detector

NO BEAMPIPE, HALL WITH AIR



Study of Photon Tagging

Electron downstream (Four Quads)

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2/ An example: Tracking event-display. 50event samples.

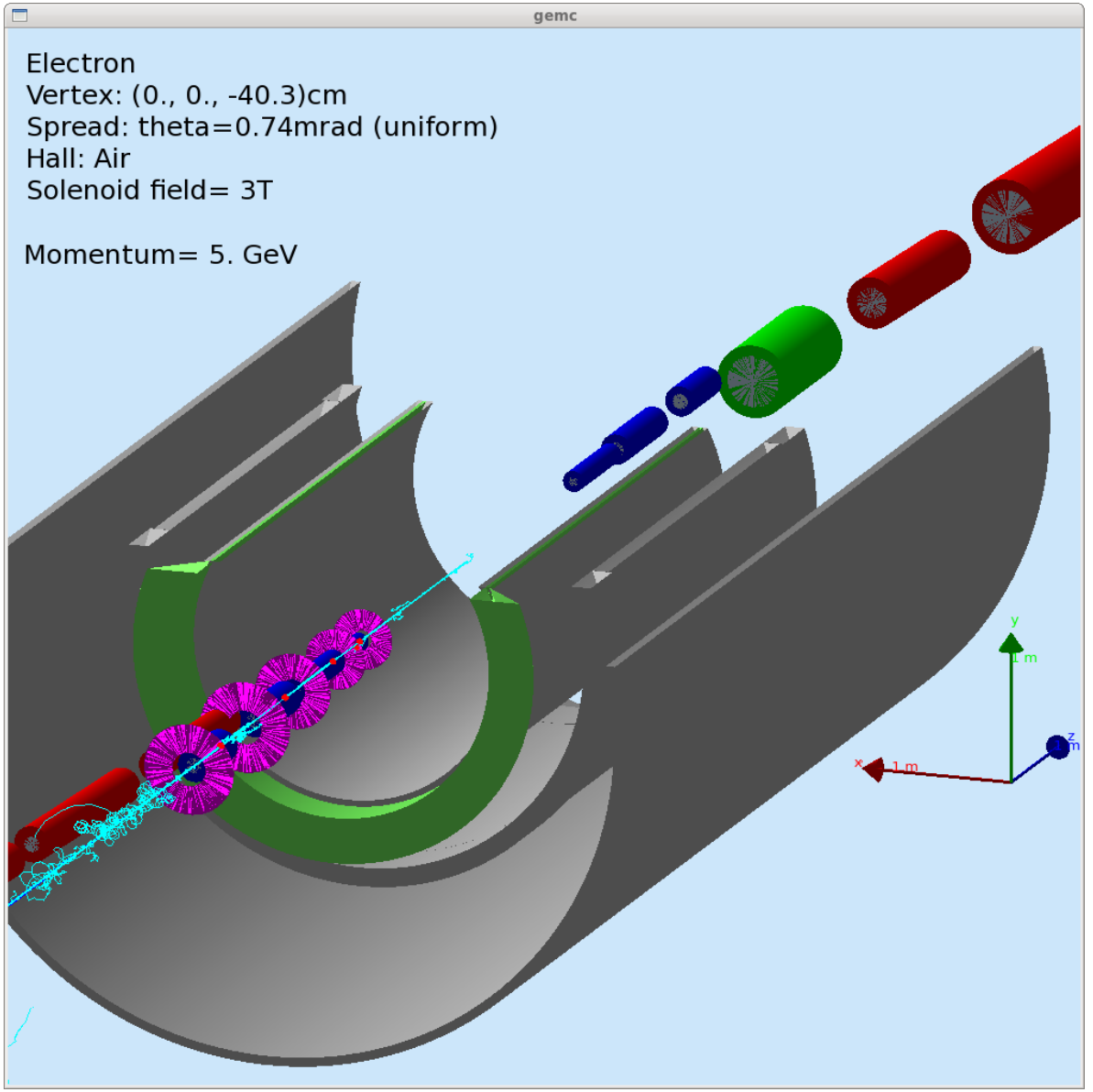
3/ A nominal electron energy(k) = 5GeV

Right plot p_e ***= 1 * k = 5 GeV/c***

4/ Purple donut shape disk :

virtual detector

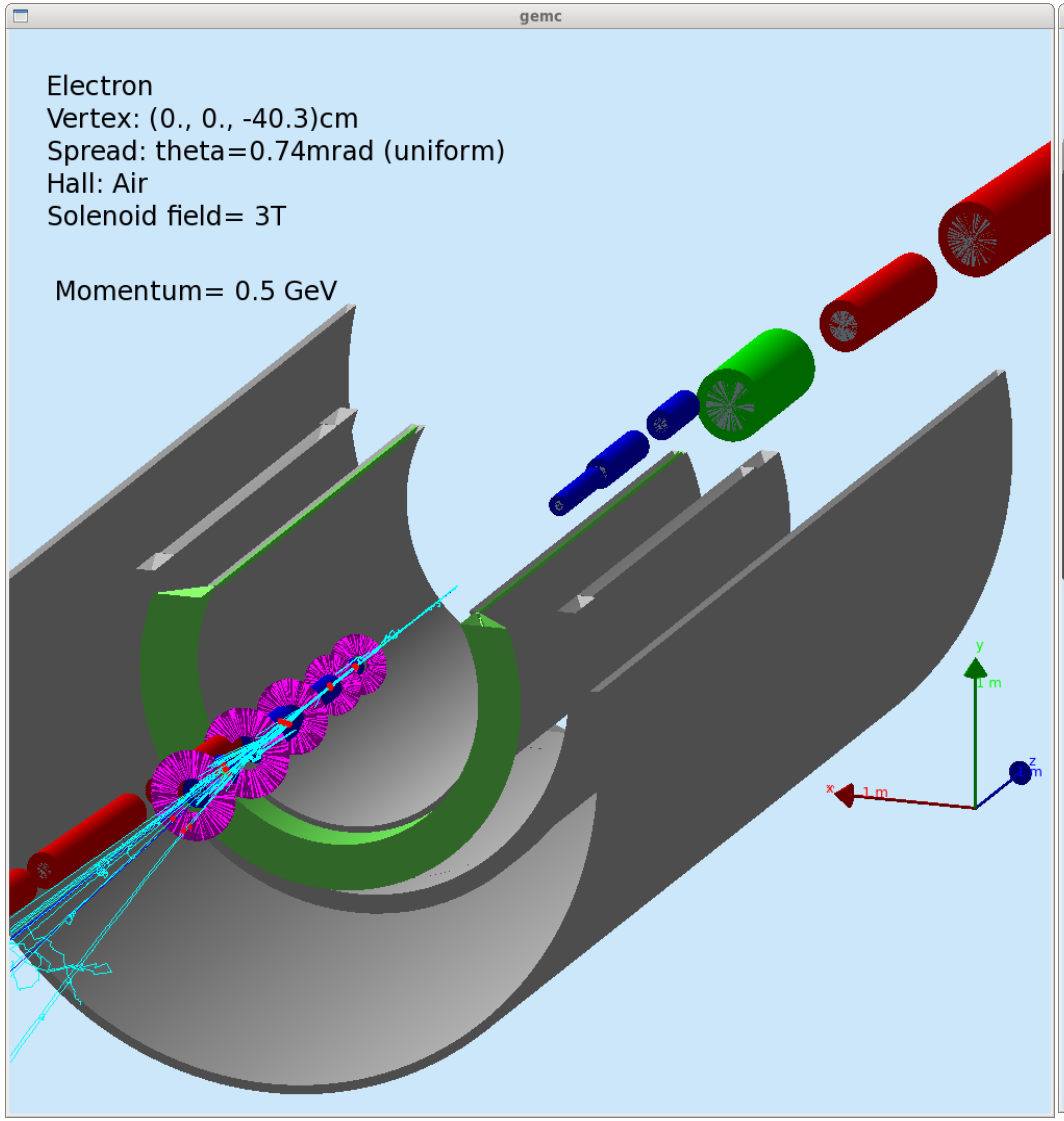
NO BEAMPIPE, HALL WITH AIR

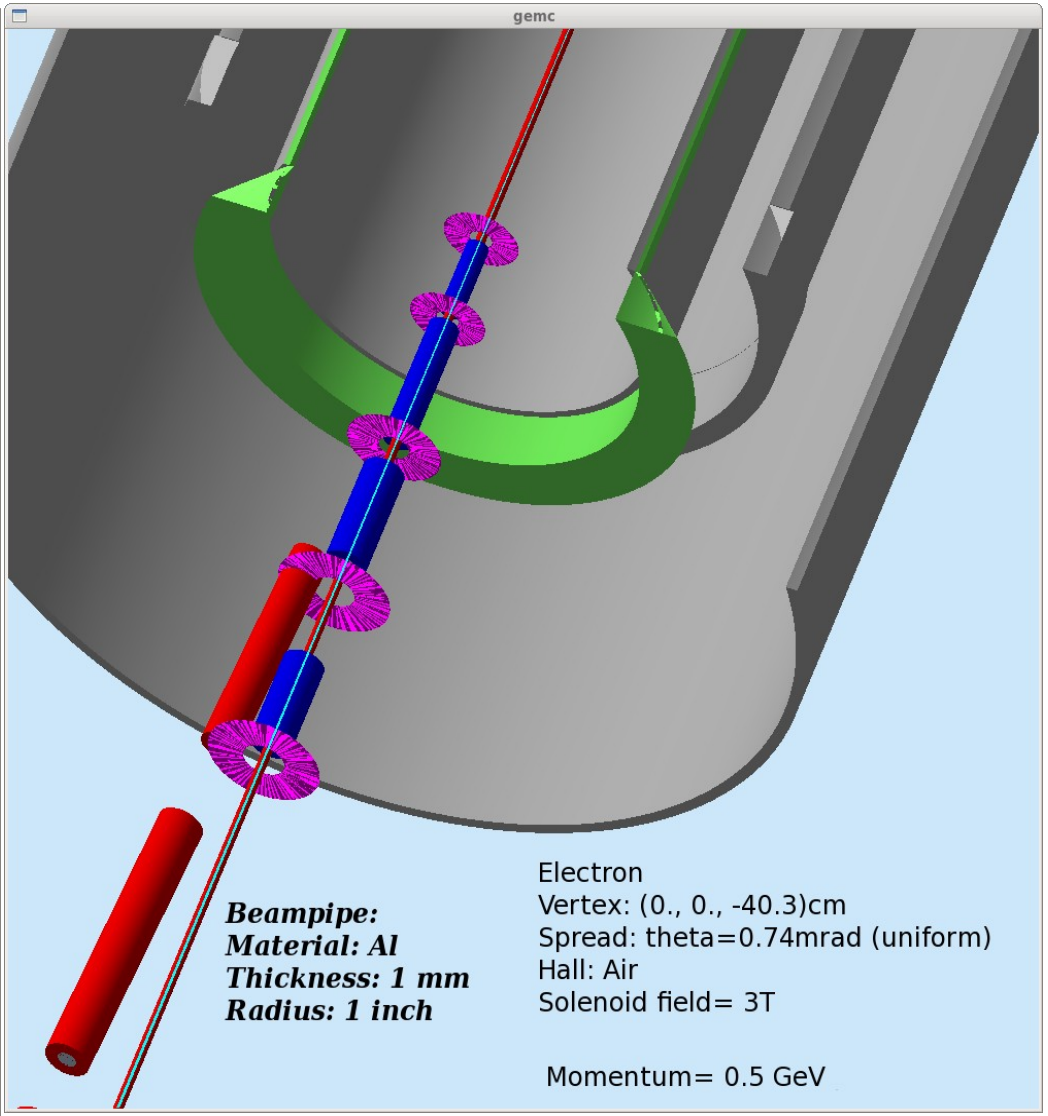


Beam-air interaction: this creates flaring rays along the beam-line, because there is no beam-pipe here

NO BEAMPIPE, HALL WITH AIR

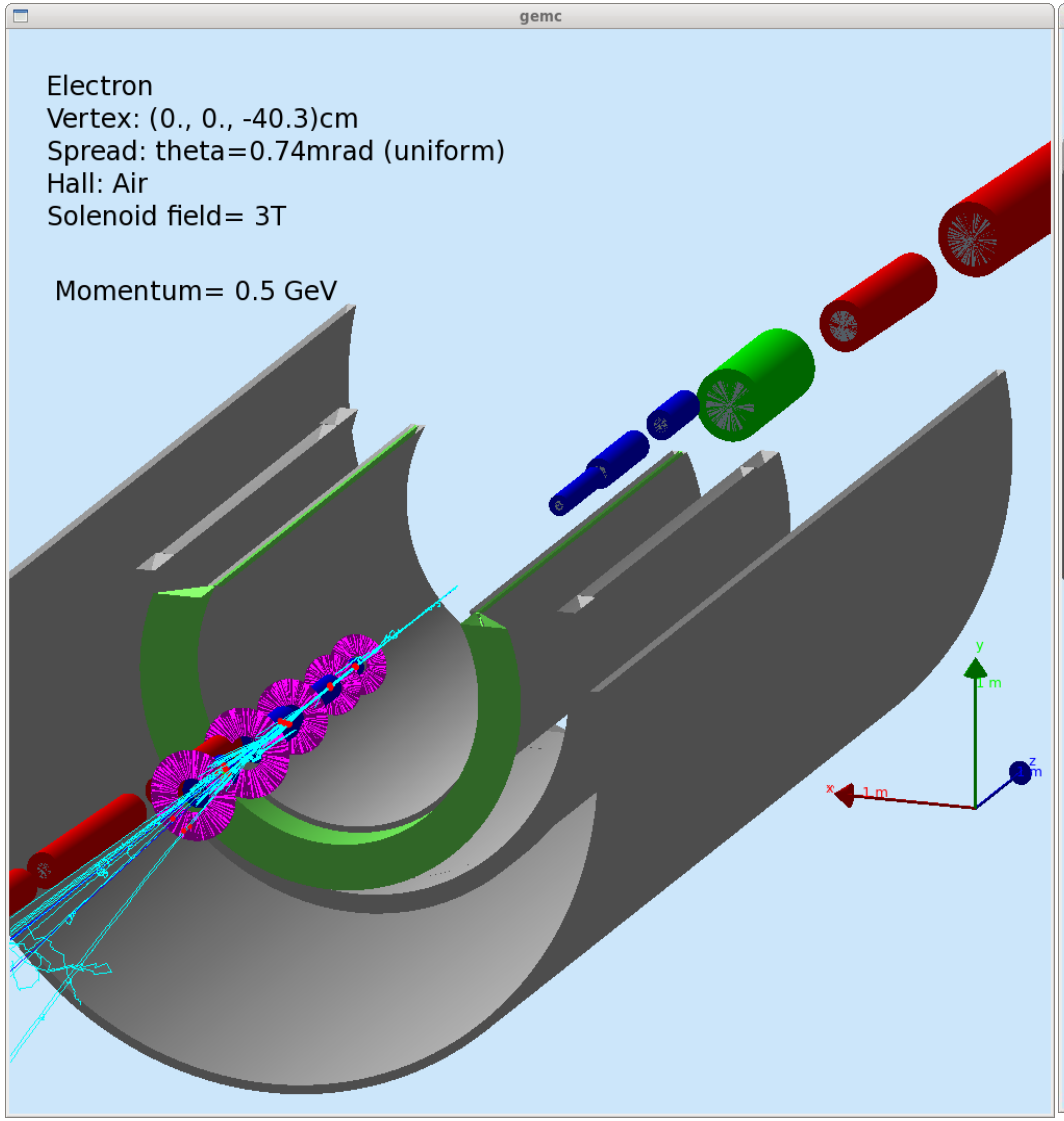
e- BEAMPIPE, HALL WITH AIR



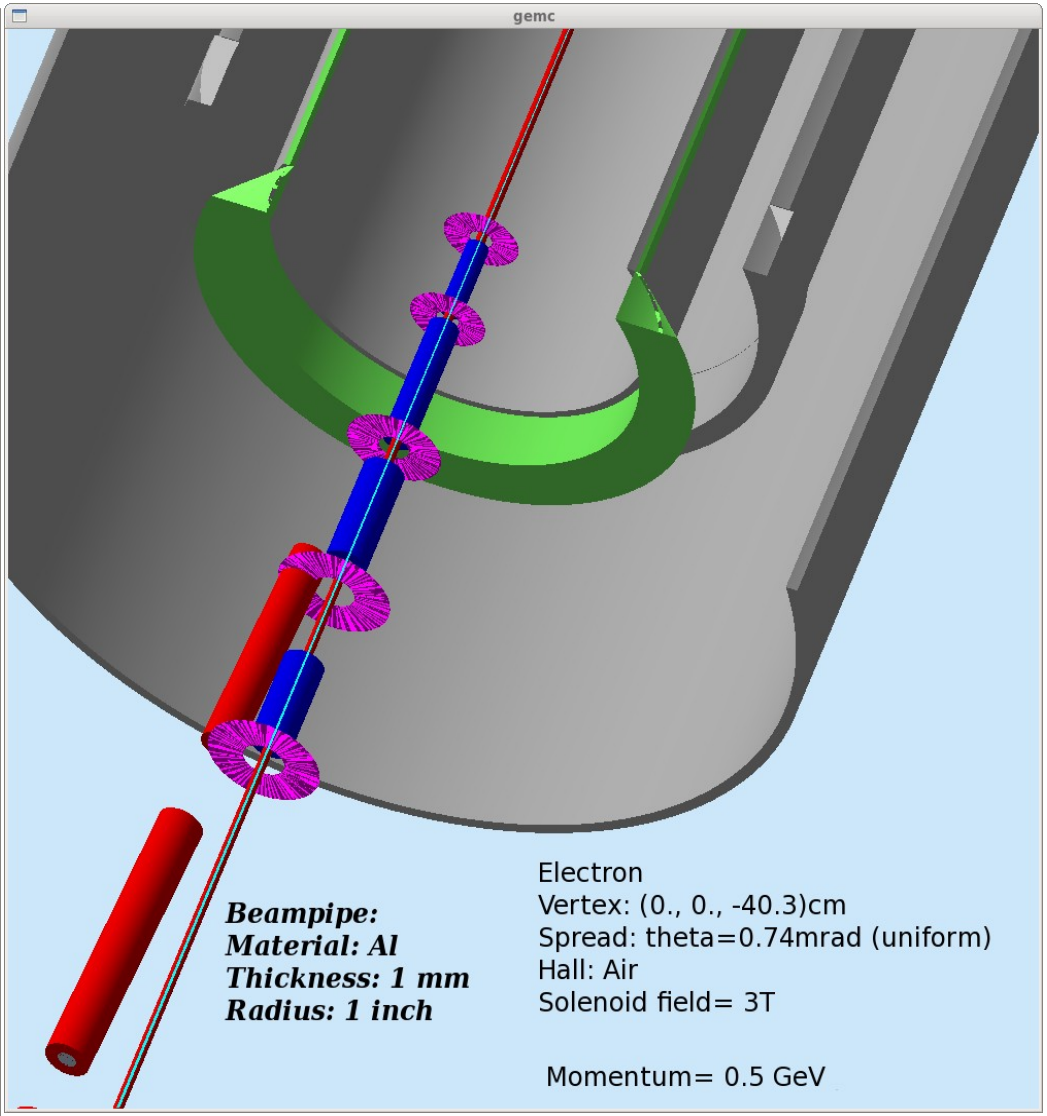


Beam-Air interaction produces a flaring ray along beam-line (left). Once beam-pipe (inside vacuum), it shows a clean electron track (right).

NO BEAMPIPE, HALL WITH AIR

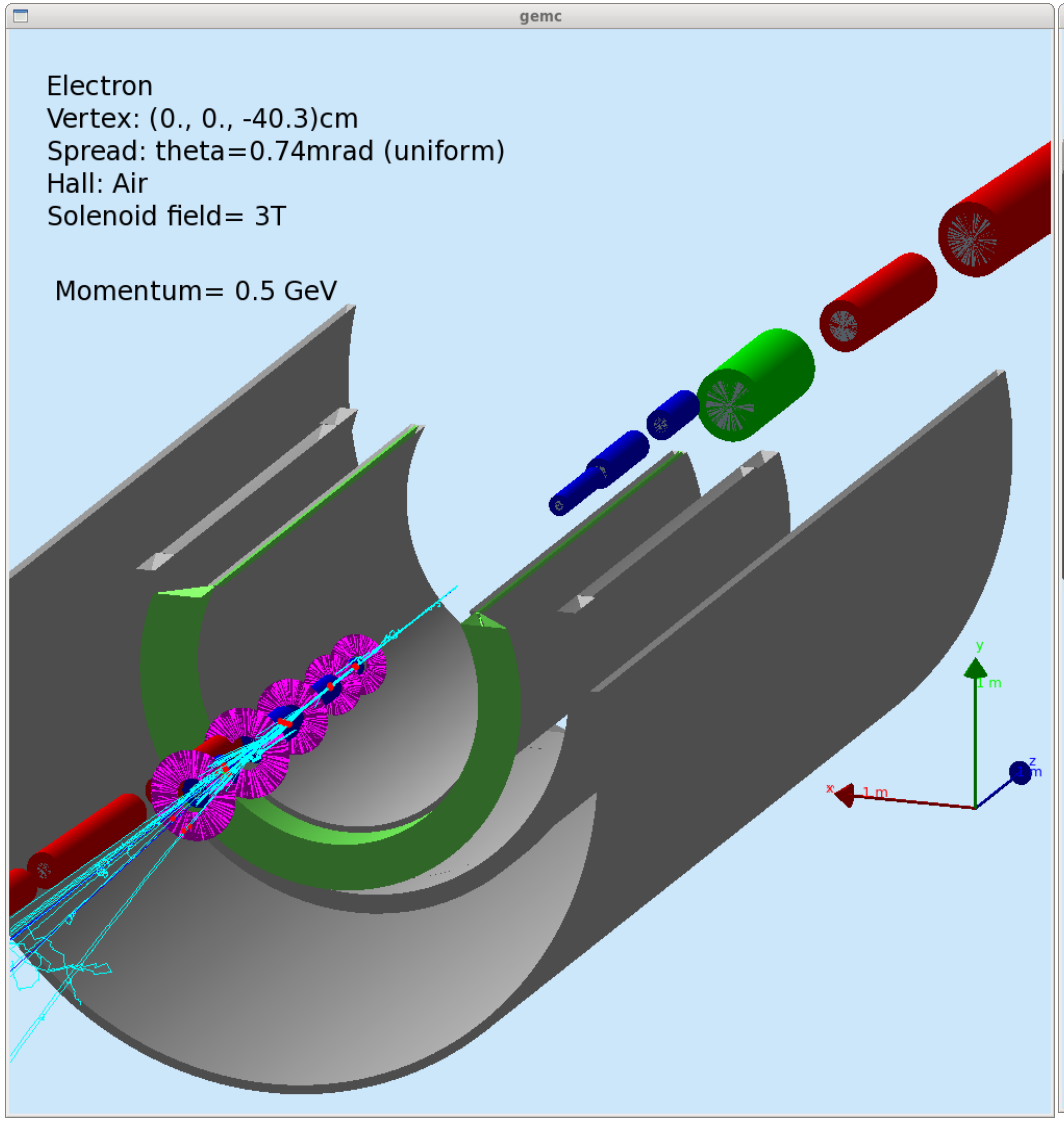


e- BEAMPIPE, HALL WITH AIR



1/ This shows it is possible to measure photon energies of 0.9xbeam energy with out loss !

NO BEAMPIPE, HALL WITH AIR



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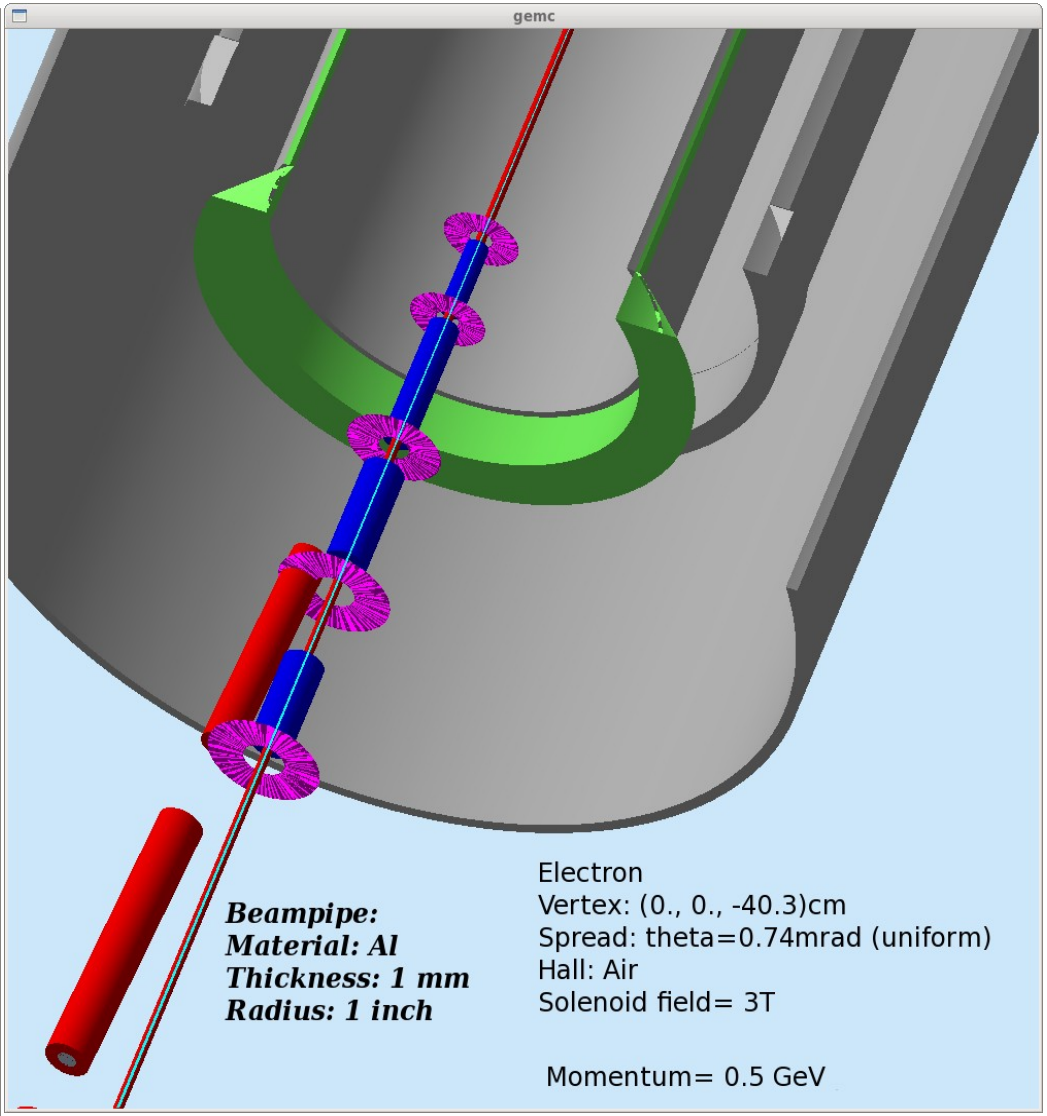

To Do: **1/ Spread: Uniform vs. Gaussian**

2/ Check: Electron angular distribution

NO BEAMPIPE, HALL WITH AIR

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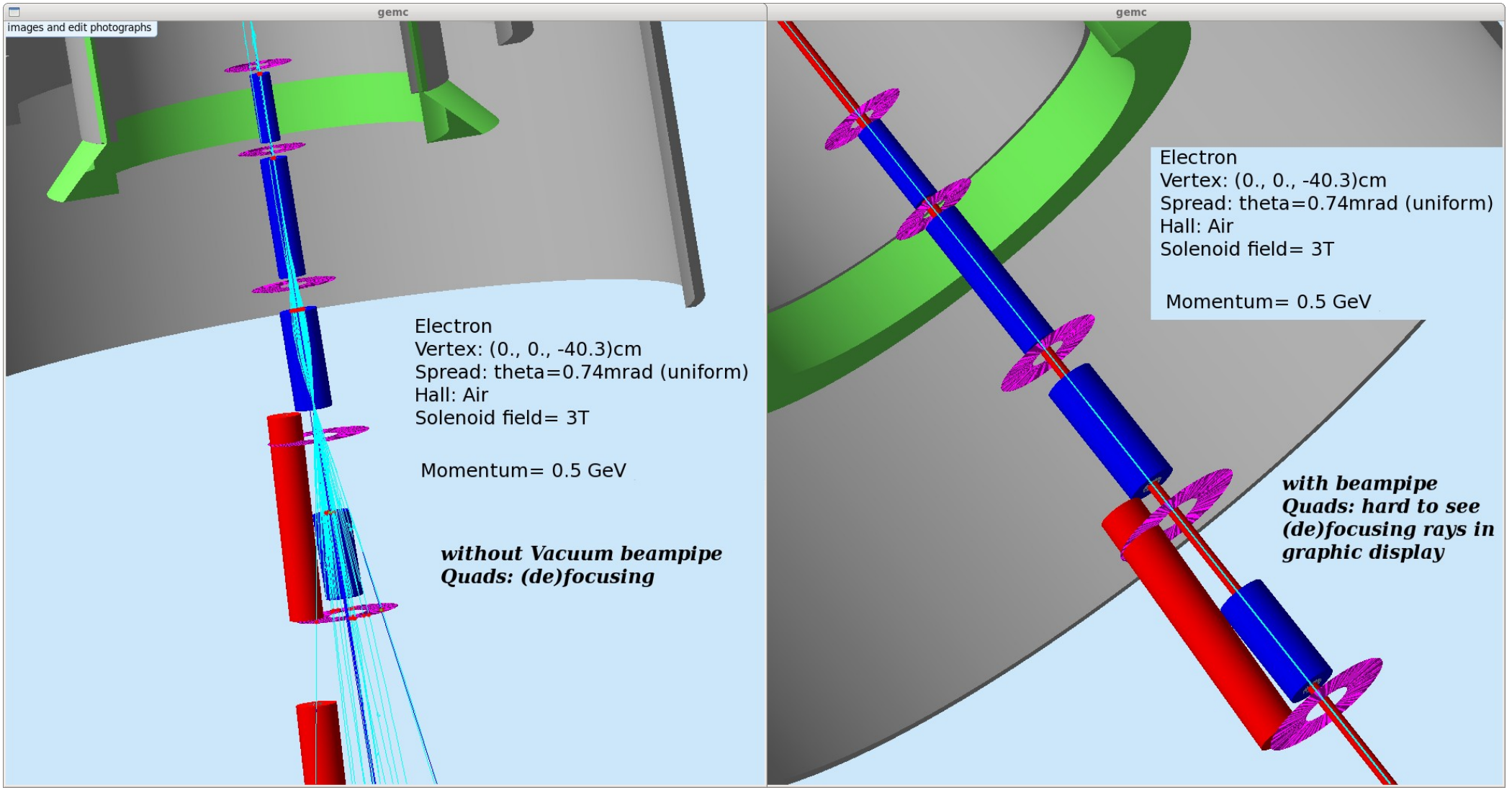

It clearly shows Quads are functioning, electrons are defocusing(interaction with air) & focusing (left). Once beam-pipe (inside vacuum), it is hard to see spreadness like left figure due to a small beam spread RMS=0.74mrad (right). [30m away from IP, 2.2cm spread (still inside beam-pipe)]