

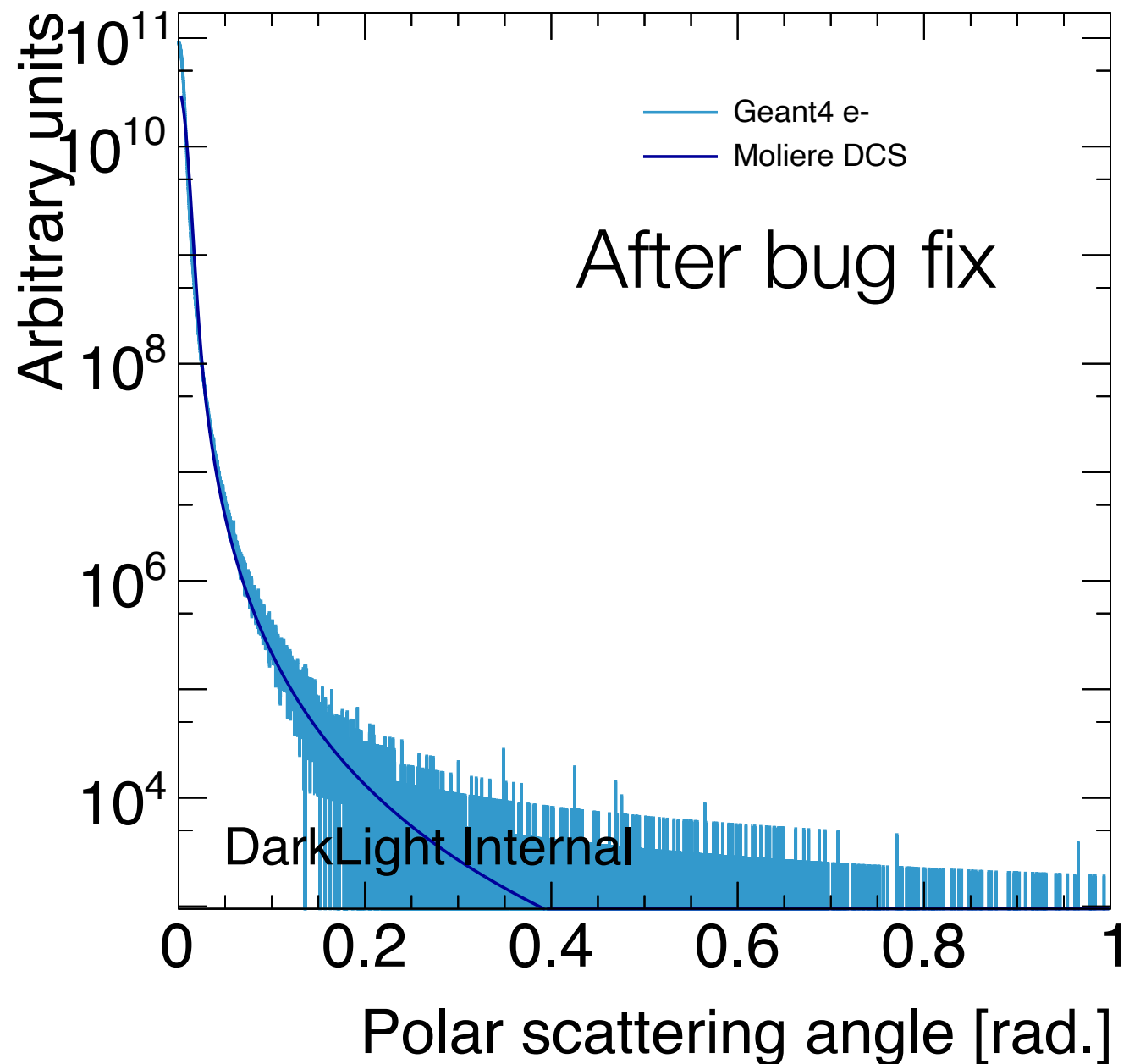
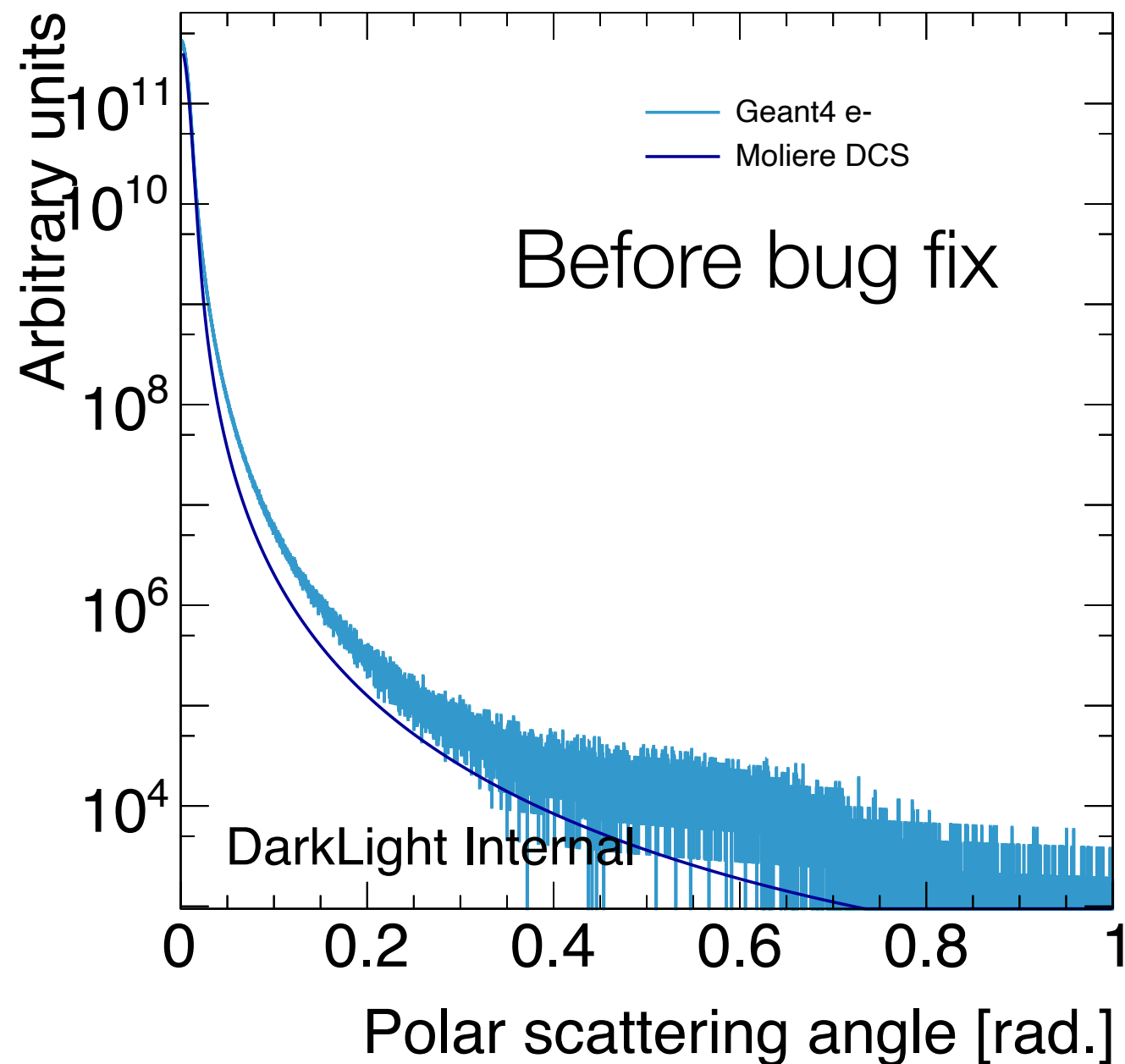
Multiple scattering in foil as input to Transoptr

Kate + team

Bug fix

- 1000x thanks to Laura for finding a bug in my long-ago inputs to Aveen!
- Was using a 2 micron foil instead of a 1 micron foil in computing RMS of scattered electron angle
- Results similar enough that discrepancy wasn't obvious in cross checks against back-of-the-envelope multiple scattering estimates from TDR, but became clear in comparison between G4 and Transoptr beamline transport simulations
- Goal 1: fix inputs for Aveen & Thomas

(Re-)validation of results



→ Slightly worse agreement near 0,
but DCS not really good there

→ Much closer agreement in tail
→ Shoulder reduced by thinner foil

Aveen, Thomas - requested input?

- I believe you take RMS of scattered electrons, but not entirely sure how this is defined. Polar angle? Normalised by solid angle, or total? Other?
- Plots on last slide were normalised by solid angle. Just accumulating all electrons into hist of polar angle gives a distribution that doesn't peak at zero, but might be more what you want
- Can give you input root file in the same format you used before, but I would also like to have a good calculation of the RMS to make a clear comparison between beam energies.

Testing other energies

- Amount of scattering is also **energy dependent**. Multiple scattering estimates passed to Aveen for initial studies are from 30 MeV kinetic energy electrons.
 - Used to set Geant4 /gps/ene/mono. My understanding is that this is kinetic energy, so same as Aveen's definition.
- If we want to understand beam behaviour at other energies, need other multiple scattering profile
 - When we were just looking at 31 or 32 we weren't too worried because the differences are small, but if we are looking at 10 or 20, the differences would be significant.
- Note that at present Thomas finds that he can't get a beam tune that works with our optics below 20 MeV, even with the target **out**. So we are a little ways from needing this. But want to provide them now all the same.
- Note also: Ethan clarifies that if we can't get a good result below 20 MeV, that's OK - we will just do Moller at higher energies. Should not allow primary results to be derailed for this.

Multiple scattering dependence on energy

