Subject: Re: Group velocity for Cherenkov photon propagation in G3/G4
Posted by Jochen Schwiening on Thu, 27 Jan 2011 10:33:10 GMT
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Hi Mohammad,

thanks for the suggestion.

I tried this on G3 and G4. The track entering and exiting are both well-defined quantities for Cherenkov photons in Geant 3 where the TrackLength and TrackTime are defined as I intuitively expect: the clock (time and path) starts when the photon is produced and stops when the photon exits the bar at the backward end of the bar, which I selected as my stop point. In Geant 4, however, the photons exit and re-enter on every internal reflection, which means that a photon which propagates inside the bar for 400cm only reports a TrackLength on the mm level and a TrackTime on the picosecond scale, corresponding to the last bounce before exiting the bar at the backward end. Therefore, the calculated velocity is not based on the same paths as the G3 numbers.

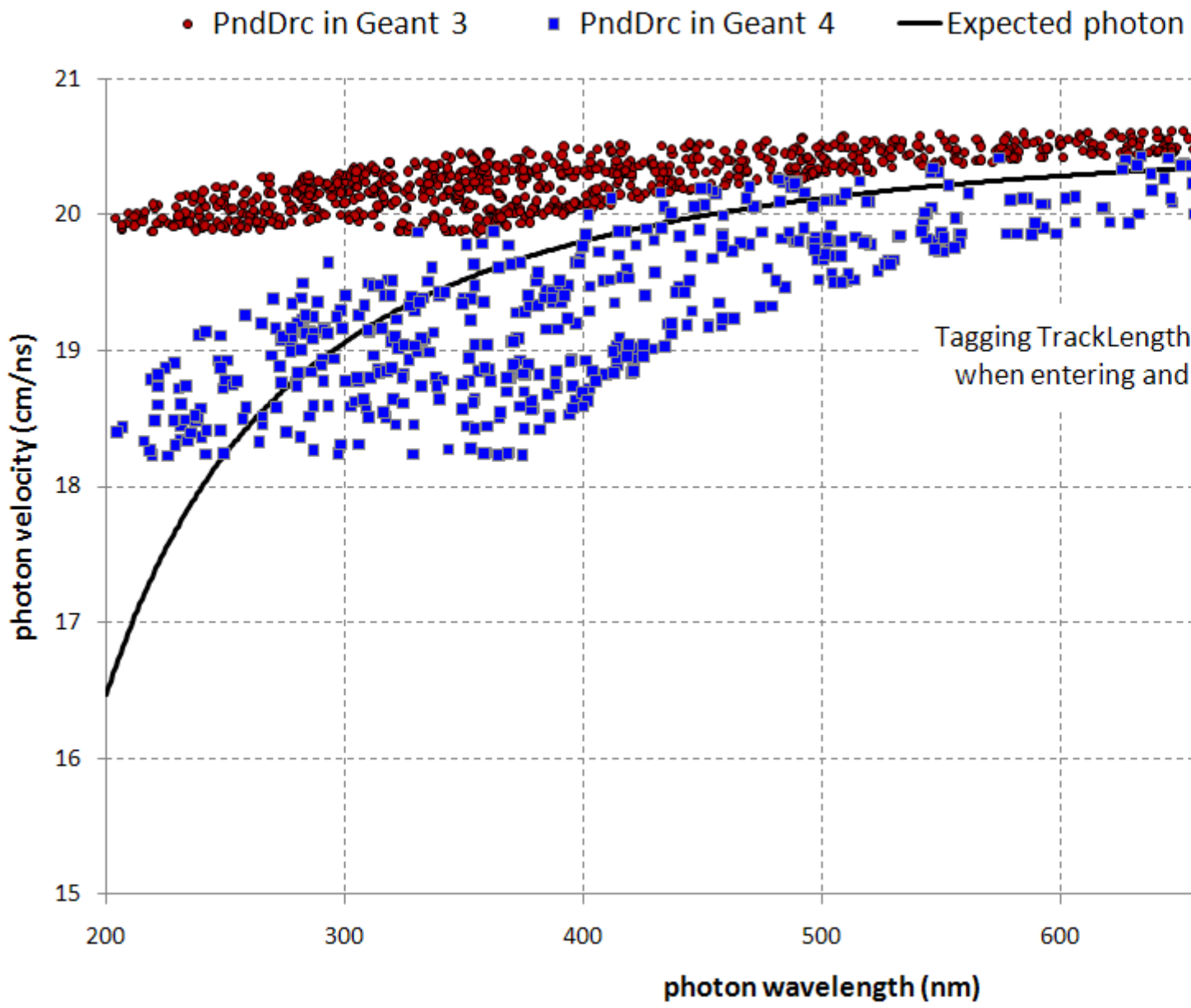
Having said that, the distribution of velocity vs. wavelength looks somewhat different now but still strange, as you see from the attached plot. I still don't see any reason why the velocity for a given photon in Geant (3 or 4) is not a single number but is spread out so much - unless the path or time quantities are not the true/correct numbers.

Any ideas?

Thanks,
Jochen

File Attachments

1) pandaroot_geant_v_vs_lambda_tag.png, downloaded 1731 times


PndDrc in Geant 3
PndDrc in Geant 4
Expected photon
21
20
19
18
17
16
15
photon velocity (cm/ns)
200
300
400
500
600
photon wavelength (nm)
Tagging TrackLength
when entering and