Subject: Experimental verification of the Geant4 physics list for S438
Posted by C. A. Douma on Sun, 15 Jan 2017 11:24:07 GMT
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Dear Mr. Kresan,

I made a comparison between experiment and simulation for 3 situations of the S438 experiment.
I used Ken Miki his experimental results and did the simulation with R3BRoot. The chosen physics list .in-macro is included.

Do you have any suggestions how I can change and/or bias the physics list to bring the simulation in better agreement with the experimental result?

Picture explanation: We are looking at the second single plane of NeuLAND. For this plane we create
a histogram with 50 bins. 1 count is added to the respective bin when a bar inside this plane fired.
(calculated by Jan Mayer his NeuLAND Digitizer). Repeating this for 1000000 beam particles (=events)
gives the respective pictures.

The simulation can also be used to trace back (by G4 MotherID) what kind of particle fired the bar.
This allows us to see the breakdown of the picture for the simulation case, but not for the experimental case.

Hence, as a comparison, one can only look to what extend the total sums match.
Applying the VETO condition means here that an entire event is discarded when at least one bar in the VETO fired. VETO responce is also calculated with Jan Mayer his digitizer.

Yours Sincerely,
Christiaan Douma.

## File Attachments
1) Verified.zip, downloaded 587 times

Subject: Re: Experimental verification of the Geant4 physics list for S438
Posted by Dmytro Kresan on Mon, 16 Jan 2017 08:12:01 GMT
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Dear Christiaan,

before we can discuss further, have a look at the following link. We had a Video-meeting on Geant4 physics lists in R3BRoot, and I recommend you to read the minutes and to go through my slides.

https://www.r3broot.gsi.de/meetings R3BRoot Physics Lists Videoconference, October 19-th

Best regards,

Dima

Subject: Re: Experimental verification of the Geant4 physics list for S438
Posted by C. A. Douma on Mon, 16 Jan 2017 11:52:54 GMT
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Dear Mr. Kresan,

This morning I have read the minutes and went through all the slides (I was also present during this meeting).
However, I still find the nature of the differences between the physics lists very difficult to understand.
That is why I contacted you. I was hoping you could provide some insights.

Yours Sincerely,
Christiaan Douma.

PS: In my previous message I failed to report that the blue line is from a simulation from Ken Miki.
The red one is the experimental data. The coloured histograms are my own simulation results.

Subject: Re: Experimental verification of the Geant4 physics list for S438
Posted by Dmytro Kresan on Mon, 16 Jan 2017 12:09:50 GMT
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Dear Christiaan,

the reason why I mentioned the meeting we had and my only advice currently (since I am not involved in simulations, in particular with Geant4), is that one should not use R3B Physics List in the form it is written now. We will not be able to understand what is going on inside and how to fix it.

I would use one (or even several, most suitable for neutrons) of the existing Reference physics lists, and in order to achieve better quantitative agreement, I would tune the lower cuts. Those have a visible effect on hit multiplicity distributions.

What concerns looking at different particles separately, here I am very skeptic. This you do not have in the data anyhow.

Best regards,
Dima