Subject: elastic neutron scattering in Geant3
Posted by David Barton on Thu, 21 Jan 2010 17:17:22 GMT
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I'm trying to output the energy loss and interaction position for ~1 MeV neutrons elastically scattering in my detector. I'm using the GCALOR package to process the events and I'm getting somewhat strange results. I'm finding large reductions in the kinetic energy of the neutron (up to >90%) which seems impossible for elastic scattering in my material. It seems that I must be getting inelastic events mixed in, but the rate seems rather high and these event don't appear at all when I'm looking for events that have a total energy loss (DESTEP > 0). I'm monitoring IPART for my events and all of the events have a neutron coming out, but when I look at only events where DESTEP is > 0 I only get protons out. [Is there a parameter that looks at the total energy of your initial particle? DESTEP seems to be the total energy of the total interaction]

I'm really not sure if I'm doing something wrong, if there is a problem with the program or if the results are correct, but I figure it probably is something that I'm doing wrong. If anyone has any advice related to neutron elastic scattering that would be great.

Subject: Re: elastic neutron scattering in Geant3
Posted by Mohammad Al-Turany on Thu, 21 Jan 2010 18:50:06 GMT
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Hi,

First of all are you using the vmc (i.e PandaRoot) or the native fortran stuff?

I am not sure I understand what you are doing but the DESTEP is the total energy lost in one (current) step, and not for the total energy loss in material.

Quote: I'm finding large reductions in the kinetic energy of the neutron (up to >90%)

How did you measure this, did you look at GETOT?

Also what cuts are you using, I assume you change the default if you are using 1 MeV neutrons.

regards

Mohammad

Subject: Re: elastic neutron scattering in Geant3
Posted by David Barton on Thu, 21 Jan 2010 20:20:01 GMT
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I'm using the native fortran stuff. For the kinetic energy I'm using GEKIN, and I'm using a 1 keV cut for the neutrons.

I see now that there is a GETOT parameter, but I guess what I really would like is something that looks at the energy lost by the particle in each step, similar to DESTEP. But this isn't my biggest problem. The real problem is the very large energy losses.

Thanks

David

Subject: Re: elastic neutron scattering in Geant3
Posted by Mohammad Al-Turany on Thu, 21 Jan 2010 21:20:09 GMT
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Hi,

How can you get very large energy losses and at the same time you wrote:

but when I look at only events where DESTEP is > 0 I only get protons out

So maybe something is wrong in the way you register your hits!

When using GCALOR the energy cut-off for neutrons CUTNEU has to be set to a reasonable value (you can go down to 10E-14 GeV), GEANT will complain but you can ignore the warning. Also the time cut-off has to be set to a value, which allows to track the very slow energetic neutrons till they are captured or fall below the energy cut-off.

What kind of detector you are simulating? and Why with native FORTRAN?

Mohammad