Subject: Re: He3 target window material Z and A
From: Zhiwen Zhao <zwzhao@jlab.org>
Date: 2/28/2017 1:52 PM
To: yuxiang zhao <yuxiang.zhao@stonybrook.edu>
CC: Rakitha Beminiwattha <rakithab@jlab.org>

To be clear, the FAEC trigger rate from downstream window is 398kHz from pipWiser and 13kHz from pipHallD
It is a factor 30 change and it should most from the normalization factor.

If the halld generator is written in a way to do any Z and A and it can get LD2 and He3 correctly, I wonder
why the window is any different?

Zhiwen

On 2/23/2017 6:39 PM, Zhiwen Zhao wrote:

> for eicrate using wiser to produce pip
> the rate factor 24200 for He3 gas, 13387 for one window
> the ratio is 1.81, very close to lumi ratio 1.6
>
> These are generator result, there is no acceptance coming into play yet.
> so it has nothing to do with angle or vertex position.
>
> by the way, I also notice this halld generator has same rate factor for
> all events in one file, but a slighly different number for another files.
> They all just differ slightly. I guess that's just how the generator
> works, no big deal.
> For eicrate code, it's always a constant.
>
> Zhiwen
>
> On 2/23/2017 6:19 PM, yuxiang zhao wrote:
>
>> what's this number by using eicrate.
>>
>> The angle will play a role here, since the upstream is push in -z
>> direction by a lot!
>>
>> 2017-02-23 18:15 GMT-05:00 Zhiwen Zhao <zwzhao@jlab.org
>> <mailto:zwzhao@jlab.org>>:
>>
>>   refer to files Rakitha made at
>>
>> /work/halla/solid/evgen/solid_bggen/lund_format/10k_lundfiles/SIDIS_He3
>>
>>   What I can see is that for He3 of "hallD_pion_p_3He_10k_1.lund", the
>>   rate factor at the end of header line is 7704
>>   For one window of "hallD_pion_p_DST_Wind_10k_1.lund", the same
>>   factor is 230
>>   As this rate factor is directly proportional to luminosity and
>>   crossection.
>>
>>   nucleon luminosity ratio between 3He and one window should 1.6,

refer to

https://hallaweb.jlab.org/wiki/index.php
/Solid_Background#Luminosity_and_radiation_thickness

<https://hallaweb.jlab.org/wiki/index.php
/Solid_Background#Luminosity_and_radiation_thickness>

Z/A is a bit different for He3 gas and window, but shouldn't give
too big difference

But now the ratio is 7704/230=33 which is factor 20 difference.
So I think something is wrong.

Zhiwen

On 2/23/2017 5:34 PM, yuxiang zhao wrote:

Hi Rakitha,

After thinking more, I think my previous two concerns are gone.
I don't
see any issue
in the code currently. I don't know why you two think that the
current
rate on glass is wrong.

Thanks

Yuxiang

2017-02-23 17:23 GMT-05:00 yuxiang zhao
<yuxiang.zhao@stonybrook.edu <mailto:yuxiang.zhao@stonybrook.edu>
<mailto:yuxiang.zhao@stonybrook.edu
<mailto:yuxiang.zhao@stonybrook.edu>>>:

BTW, why you two think that the current rate is wrong by
using Hall
D generator on glass?

2017-02-23 15:58 GMT-05:00 yuxiang zhao
<yuxiang.zhao@stonybrook.edu <mailto:yuxiang.zhao@stonybrook.edu>
<mailto:yuxiang.zhao@stonybrook.edu
<mailto:yuxiang.zhao@stonybrook.edu>>>:

Hi Rakitha,

Please check on the script HallD_gen_lund.cc in the
script
directory. Two things make me
feel strange:

1.
the xlum definition seems to be for "nuclei" lumi, but

"hd_total_rate" is for the rate on single nucleon,
will this cause issue? Maybe small for deuteron and he3, only a
factor of 2 or 3, but will
have big effects for effective glass nuclei with A=35.

2.
please double check the luminosity calculation, the nuclei
luminosity for glass window
effective nulcei (Z=17, A=35) is 0.054e36/cm2/s.

Thanks

Yuxiang

2017-02-23 15:46 GMT-05:00 Zhiwen Zhao <zwzhao@jlab.org <mailto:zwzhao@jlab.org>
<mailto:zwzhao@jlab.org <mailto:zwzhao@jlab.org>>>:

aha

On 2/23/2017 3:32 PM, yuxiang zhao wrote:

Hi Rakitha and Zhiwen,

I might find the reason why the numbers for glass
windows are wrong.

See zhiwen's first link, in which he made the assumption
that the glass
window with effective Z=17 and A=35 (what Rakitha used
in his code
to generate hadrons). Then the luminosity definition for
this effective
nuclei can't be calculated in the same way as for a real
nuclei like He3,
but Rakitha still shares the same code for the
luminosity calculation for
all the nulcei. See function "compute4Target". This will
cause a factor
of 3.74/0.054=69.

Thanks

Yuxiang

2017-02-23 15:22 GMT-05:00 Zhiwen Zhao
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<mailto:zwzhao@jlab.org <mailto:zwzhao@jlab.org>>>>:

see here

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and here

https://jlabsvn.jlab.org/svnroot/solid/evgen/eicRate_20101102/output
/input_solid_SIDIS_He3_window_upstream.dat

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/input_solid_SIDIS_He3_window_upstream.dat>

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On 2/23/2017 2:36 PM, yuxiang zhao wrote:

Where can I find the material definition of he3
target window?
I need the information to generate new files.