Subject: Invalid Events in Prespec Code
Posted by a_boso on Fri, 19 Aug 2016 09:37:23 GMT
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Hi everybody!

We noticed that in the 46Cr Coulex part of our analysis (which is the more exotic of the experiment) we have almost 90% of invalid events (events in which the "valid flag" is 0 in all the variables, especially in S4 scintillator). This is not the case in the 46Ti Coulex part where the invalid events where only ~30%.

This is somehow surprising since the beam rates in S4 were:

46Cr
~800 counts per spill (1.2 s)

46Ti
1e5 counts per spill (10s)

If we could recover a situation similar to that of 46Ti it would make a huge difference for the outcome of the analysis.

So I was wondering.. what does "invalid event" mean? How it is decided in the code if an event is valid or not? Is there a way to "relax" this condition and somehow recover some events?

Do you have any idea why we have such a great amount of invalid events?

Thanks!!
Alberto

Subject: Re: Invalid Events in Prespec Code
Posted by Michael Reese on Fri, 19 Aug 2016 13:03:30 GMT
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Hi,

The valid flag of any value is set if the value was successfully computed. That happens when the

set_output(NAME_OF_VALUE, 42)

inside any processor is called. That means, if the value has no valid flag set, it was not successfully computed.
Usually, processors are written in a way that they check for the requirements of a computation

```
if (input_valid(NAME_OF_NECESSARY_INPUT_1) &&
input_valid(NAME_OF_NECESSARY_INPUT_2))
{
```

```
  double input1 = input_value(NAME_OF_NECESSARY_INPUT_1);
  double input2 = input_value(NAME_OF_NECESSARY_INPUT_2);
  double result = f(input1,input2);
  set_output(NAME_OF_RESULT, result);
}
```

This guarantees to have only meaningful information propagating along the graph. You can try to track down in which processor the information is missing. With that information I could give a more detailed answer.

In general you can try if it is possible to write a more sophisticated algorithm, such as this:

```
if (input_valid(NAME_OF_NECESSARY_INPUT_1) &&
input_valid(NAME_OF_NECESSARY_INPUT_2))
{
  double input1 = input_value(NAME_OF_NECESSARY_INPUT_1);
  double input2 = input_value(NAME_OF_NECESSARY_INPUT_2);
  double result = f(input1,input2); // f is an algorithm that calculates the result from the two
given numbers
  set_output(NAME_OF_RESULT, result);
}
else if (input_valid(NAME_OF_NECESSARY_INPUT_1))
{
  double input1 = input_value(NAME_OF_NECESSARY_INPUT_1);
  // make a clever computation that needs only one of the values
  double result = f2(input1); // f2 is a sophisticated algorithm that calculates the result only with
one number
  set_output(NAME_OF_RESULT, result);
}
else if (input_valid(NAME_OF_NECESSARY_INPUT_2))
{
  double input2 = input_value(NAME_OF_NECESSARY_INPUT_2);
  // make a clever computation that needs only the other value
  double result = f3(input2); // f3 is a sophisticated algorithm that calculates the result only with
one number
  set_output(NAME_OF_RESULT, result);
}
```

Best regards,
Michael

Subject: Re: Invalid Events in Prespec Code
Posted by a_boso on Fri, 19 Aug 2016 13:45:29 GMT
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Hi Michael,

thank you for your fast and precise reply!

I tried to check where the information starts to miss; but it seems it is a common feature of all the variables still from the beginning of the analysis.

For example if I take the processor

```
processor Frs/Scintillators/dEnergySc21  UTILS.Pair
        first <-  FrsCrate.qdc1[16]
        second <- FrsCrate.qdc1[17]
        display first:second
        display first
        display second
end
```

which simply takes the "raw" values from the Frs Crate for Sc21 (but it is the same for Sc41 for example) and plots them I already see that that the
"Frs_Scintillators_dEnergySc21__first_valid" variable is 0 90% of the time.

Since FRS scintillators are the "fastest" detectors we have I did not expect to have such a large amount of invalid events in them.
Moreover it seems that these events are invalid already when they come out from the Frs Crate; this is what I don't understand. What does it mean that raw values from the Crate are invalid?

Thank you very much, and sorry for bothering you!!

Alberto

Subject: Re: Invalid Events in Prespec Code
Posted by Michael Reese on Fri, 19 Aug 2016 19:12:53 GMT
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I agree, the Sci41 should have always information in case of trigger 10,9,8,7,6.
Perhaps there was a problem with the QDC?
You can try to get the Sci41 information from a different module.
It should be also in the first multihit-TDC in the LyccaTargetTofCrate:

LyccaTargetTofCrate.mhtdc0[20] #Sc41L
LyccaTargetTofCrate.mhtdc0[22] #Sc41R

This has to be put into a multihit preprocessor (perhaps you find it already preprocessed somwhere) before being used.

Best regards,
Michael

Subject: Re: Invalid Events in Prespec Code
Posted by Michael Reese on Sat, 20 Aug 2016 07:54:38 GMT
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Actually, there might be a problem with the unpacker, too.
I'll have a look.

Subject: Re: Invalid Events in Prespec Code
Posted by Michael Reese on Mon, 22 Aug 2016 09:14:36 GMT
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Hi Alberto,

can you please tell me one lmd filename where this problem occurs (one of the Cr runs) and one lmd file where it is better (one of the Ti runs). I would like to see if there is a difference in the raw data from the FRS crate in those files.

Best regards
Michael

Subject: Re: Invalid Events in Prespec Code
Posted by a_boso on Mon, 22 Aug 2016 13:24:27 GMT
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Hi Michael,

this feature is there in all the runs; see for example

46Ti_coulex_AR12_0030.lmd
and
46Cr_coulex_AR16_0061.lmd

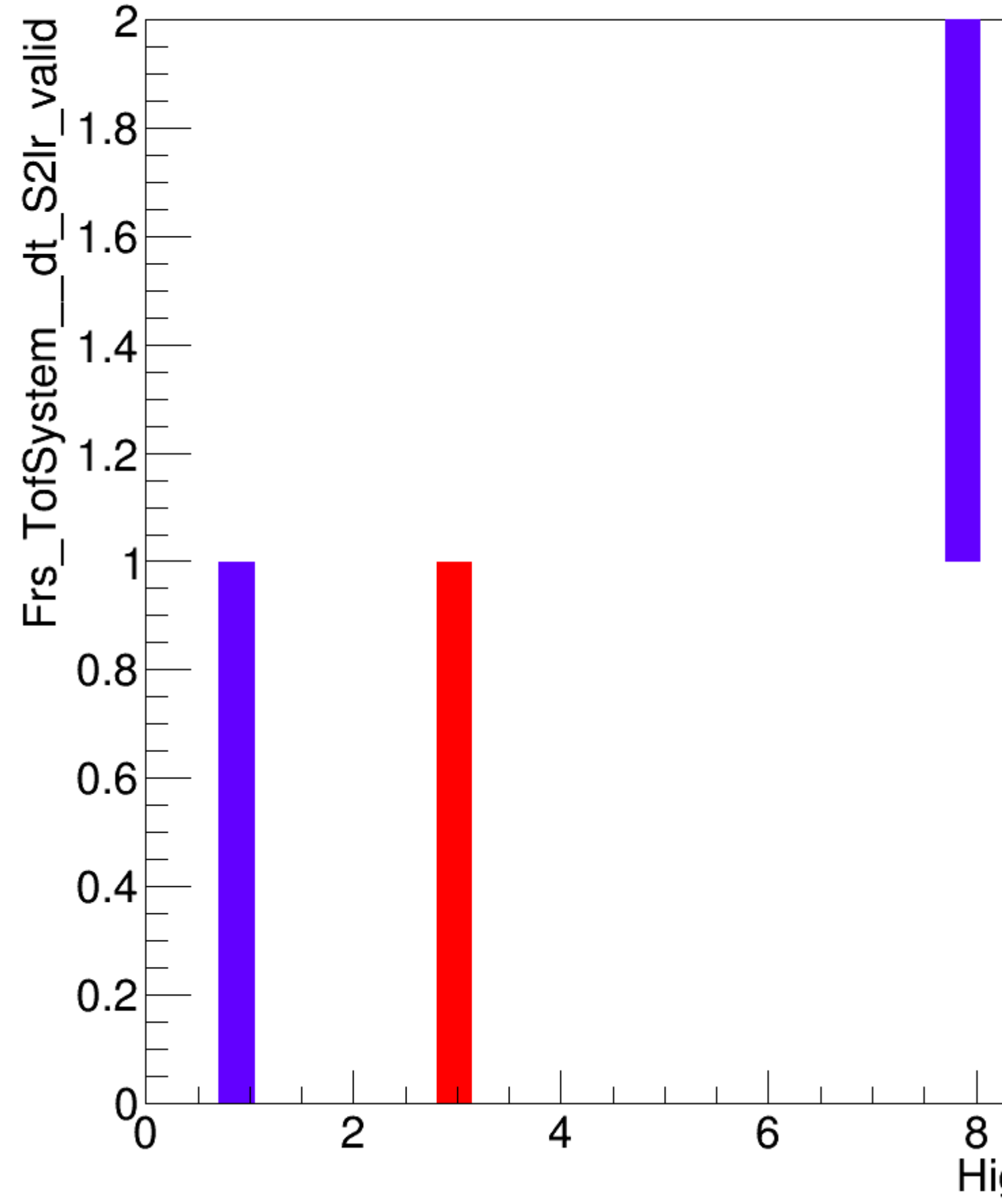
However, following your last reply to this post I plotted one scintillator variable valid flag versus the trigger value, and I obtained the behaviour reported in the attachment.

So it looks like we have a huge amount (~90%) of trigger 3 events, so AGATA alone. This is not the case for 46Ti, and looks a little bit strange to me. These events are probably not usable for the cross section measurement; however it seems that there are no mistakes in the analysis and this is really what we got from the experiment!!

Thank you!!
Alberto

File Attachments

1) Screenshot from 2016-08-22 09:47:28.png, downloaded 1118 times


Frs_TofSystem__dt_S2lr_valid:HighLev
Frs_TofSystem__dt_S2lr_valid
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
2
4
6
8
Hi