

Data flow coupling and trigger rate analysis

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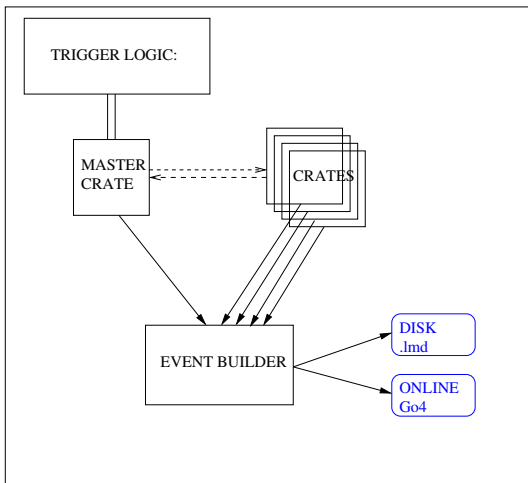
Coupling of data flow:

- one from the complementary detectors: MBS(Multi Branch System)
- The second one from AGATA: NARVAL

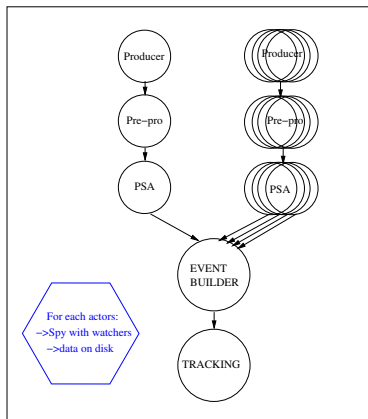
Need some tools to “spy the data flow” and to control that everything goes well.

- The coupling
 - Data flow in MBS
 - Data flow in Narval
 - Coupling of the data flow
- Online
 - Go4 analysis
 - GammaWare
 - Filter
 - Future development
- Trigger rate results
 - Trigger generation
 - Test performed
- Summary

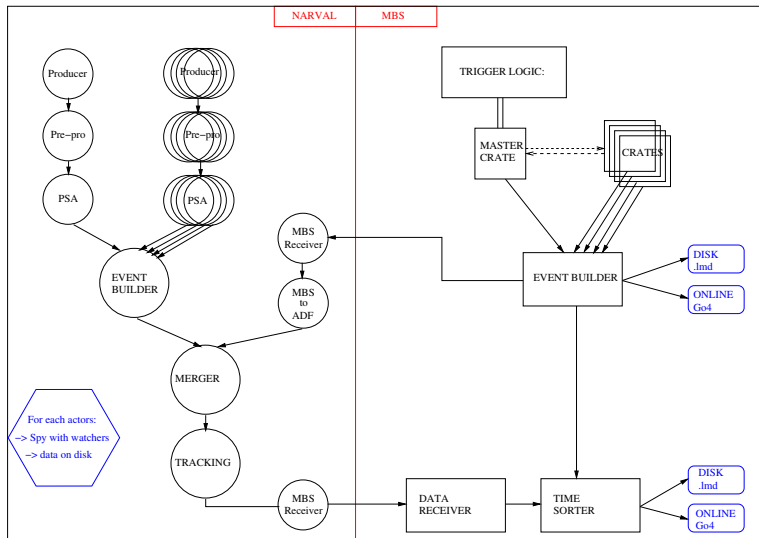
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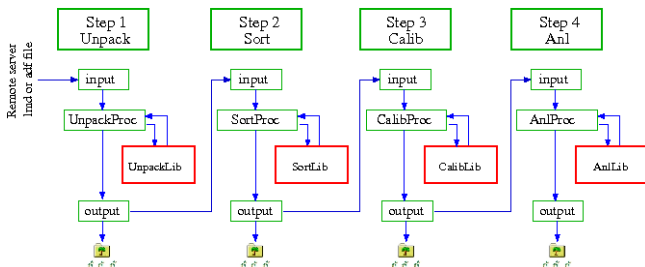
- Possibility to spy at the level of the event builder
- Data write on disk at the level of the event-builder



- At each step: possibility to write files
- If file written at the level of producer/pre-pro can replay all
- Spy possibility for all the actors.



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- Go4 = PreSPEC ONLINE
- Spy on the level of the MBS event-builder
- Analysis in steps: unpack, sort, calibration, analysis
- Development into library: available to the community
- Input files : .lmd (MBS) and .adf

Edana Merchan is in charge of the Go4.

- Spy of NARVAL actors
- Read .adf files
- Utilisation of the PreSPEC library
- First test with Olivier Stezowski at the “Unpacker” level done on the data files from the NARVAL actor(MBS receiver): WORKS

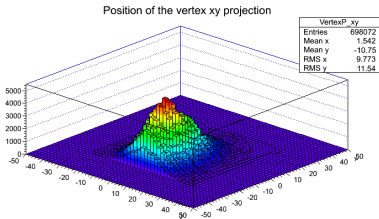


Figure: DSSD position from the Filter

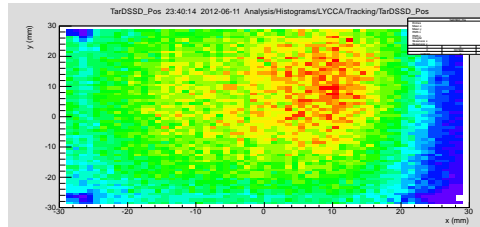


Figure: DSSD position from Go4

- Wide beam section
- Tracking algorithm: need position of the source
- Add an actor in NARVAL to get the target DSSD position from the MBS data flow
- First test off-line of this actor with Olivier Stezowski → some bugs have to be corrected

- Add the filter in the PreSPEC package (same repository as PreSPEC library)
- Test the sort and calibration step of the library
- Keep developing the PresSPEC library, especially the analysis part
- Prepare the Go4 to read merged .lmd data files and analyse AGATA data
- Test of the Watchers with GammaWare
- Put the “Filter” into NARVAL for online tests

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- Trigger: Particle (Plastic SC41) in coincidence with a Gamma
- Gamma = inspection line of the core passing in CFD (Constant Fraction Discriminator)
- OR of all the gamma signals

$$P_{interaction} = \frac{Nb_{particle+gamma}}{Nb_{particle}} \quad (1)$$

- Half of the reaction chamber with lead shielding (2 crystals)

Some purpose of the commissioning:

- Trigger rate with AGATA
- Interaction probability
- Lead shielding needed or not
- Threshold influence on the trigger rate and interaction probability

Tests performed:

- Different threshold for different systems: beam-target
- Two target position measurement
- One double with lead shield on the reaction chamber

Shield influence on the trigger rate:

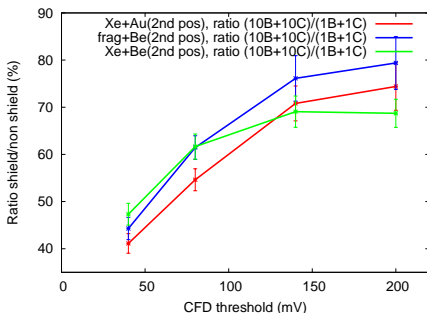


Figure: Ratio shielded detectors over non-shielded detectors

- Need to take into account a bit more statistics
- Threshold higher, ratio shield/no-shield increase \rightarrow x-rays cut with lead shield

Influence of the target at the first position on the trigger rate:

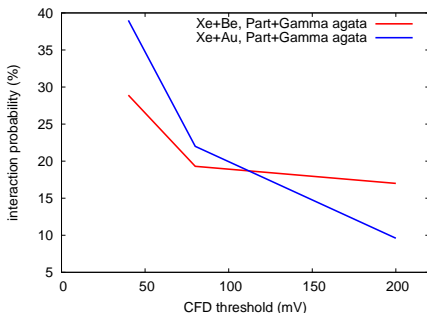


Figure: Two different targets: Be, Au

- At lower threshold: less x-rays on Beryllium target
- Crossing point with increasing threshold → Be x-rays cut after Au x-rays

Influence of the target at the second position on the trigger rate:

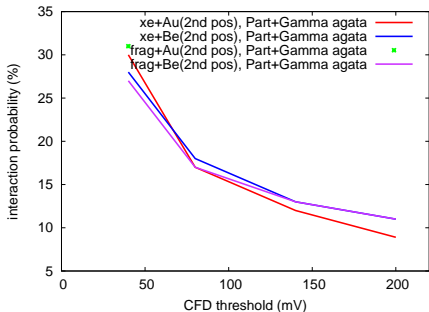


Figure: Interaction probability

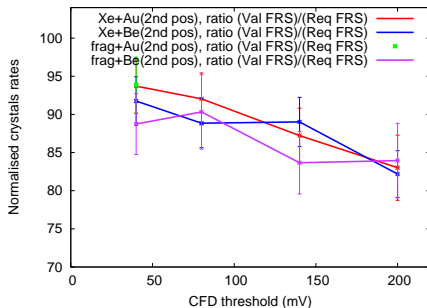


Figure: GTS rates

- Threshold higher, ratio shield/no-shield decrease → we cut the x-rays
- No obvious difference in the trigger rate with different pairs
Xe+Au/Xe+Be, frag+Au/frag+Be

Comparison of the target position on the trigger rate:

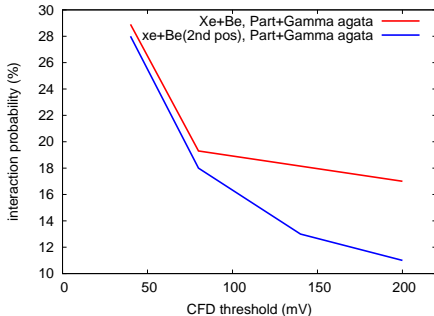


Figure: Beryllium target

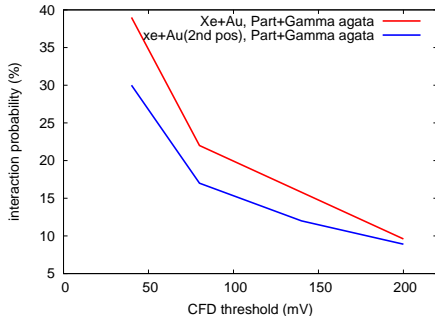


Figure: Gold target

- With increasing threshold, cutting more x-rays
- Effect more important on the second position → see more x-rays at the second position

Comparison type of beam Ti/Xe/U on the trigger rate:

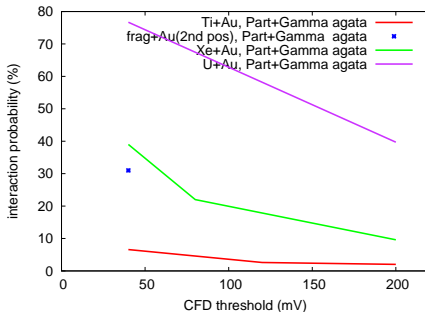


Figure: Different beam on gold target

- For Titanium beam, 5 crystals only → more informations from simulations to conclude
- High interaction probability especially for Uranium

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- Need a more precise analysis with error bars
- Very high interaction probability
- Need lead

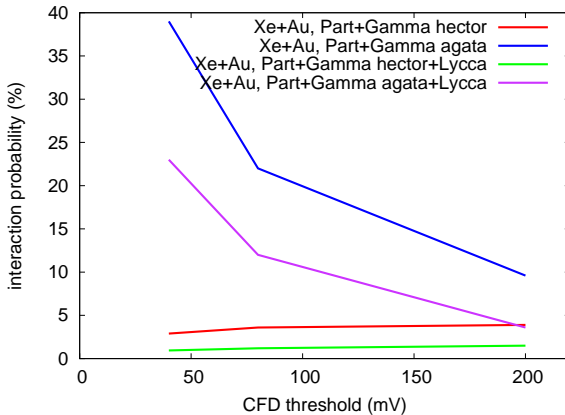
Warning: this assumes that the setup of f`user has been done and is undamaged.

```

LMU-in:   1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 A1 A2 A3 A4
Delay.:  26 36  0 26  0  0  0 13  0  0  0  0  0  0  0  0          0  ena red

1: 0                                     off  0
2: 0           or or or or or           off  0
3: C             +                       +   off  0
4: C             +                       off  0
5: C   +                                     on  0
6: C       +       +                       off  0
7: C       +       +                       off  0
8: C       +       +           +       +   off  0
9: C       +       +           +       +   off  0
10: C      +                                     off 10
11: 0                                     off  0
12: 0                                     off  0
13: 0                                     off  0
14: 0                                     off  0
15: 0                                     off  0
16: 0                                     off  0

```

For the runs Be+Au of the 26/05/2012

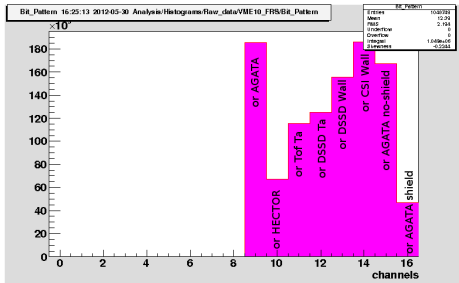


Figure: Bit pattern Xe-Au

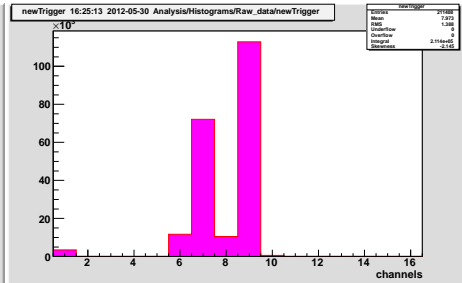


Figure: Trigger pattern Xe-Au

File: beam_Ti-target_Au.dat

#th	#pg h	#pga	#pgh1	#pgal
40	2.73	6.58	0.65	1.99
120	2.85	2.61	1.63	1.69
200	2.94	2.02	1.69	1.17

File: beam_Xe-target_Au.dat

#thr	# pgh	#pga	#pgh1	#pgal
40	2.9	39	0.94	23
80	3.6	22	1.2	12
200	3.9	9.6	1.5	3.6

File: beam_U-target_Au.dat

#threshold	# pgh	#pga	#pgh1	#pgal
40	4.23	76.7	0.73	17.3
200	8.78	39.7	3.56	24.2

File: rate-beam_Xe-target_Au-sepo-lead.dat

#thr	#freeFRS	#ValFRS
40	1430	1340
80	1532	1410
140	1268	1106
200	836	694

File: rate-beam_Xe-target_Be-sepo-lead.dat

#thr	#freeFRS	#ValFRS
40	1722	1580
80	1632	1450
140	1620	1442
200	1594	1310

File: rate-frag-target_Au-sepo-lead.dat

#thr	#freeFRS	#ValFRS
40	1370	1286

File: rate-frag-target_Be-sepo-lead.dat

#thr	#freeFRS	#ValFRS
40	1048	930
80	724	654
140	918	768
200	648	544

- with the tables for all sub-systems
- extra table with $p+g+l$
- extra graph with the $p+g+l$ triggers+ trigger pattern
- too bit pattern
- trigger explanation (print-config)



BACKUP THE END

