

Complementary Detectors: NEDA

Alain Goasduff
on behalf of the NEDA collaborations

University of Padova - INFN Padova

Agata Week 2019
Sept. 19, 2019

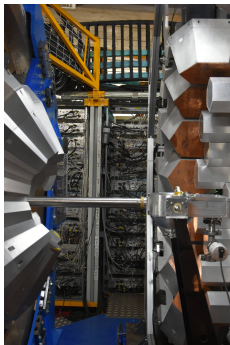


UNIVERSITÀ
DEGLI STUDI
DI PADOVA



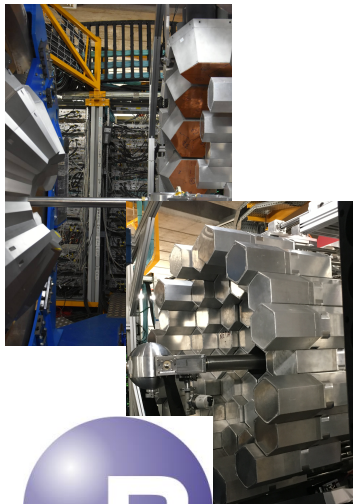
Dipartimento
di Fisica
e Astronomia
Galileo Galilei

The NEDA-NeutronWall array @ GANIL



- **96 detectors:**
 - 42 NeutronWall (650 mm)

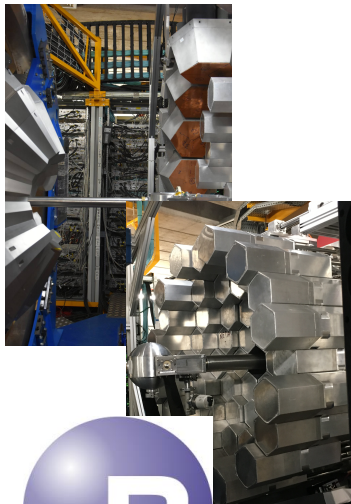
The NEDA-NeutronWall array @ GANIL



■ 96 detectors:

- 42 NeutronWall (650 mm)
- 54 NEDA (510 mm)

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■ High quality home made detectors

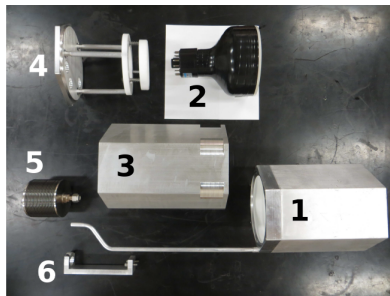
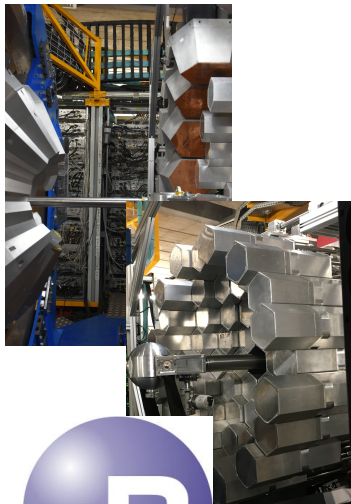


Fig. 1. Elements used for the construction of the NEDA detector: detector cell, with extension pipe (1); PMT (2); PMT housing (3); PMT pusher (4); the bellow (5) and the support for the bellow (6).



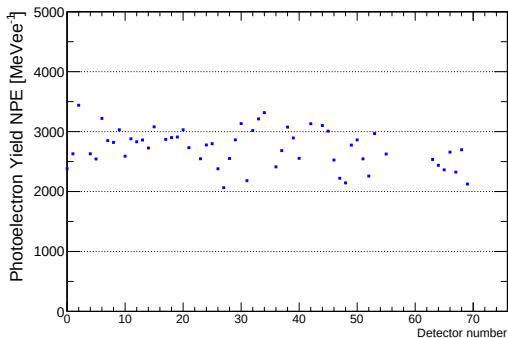
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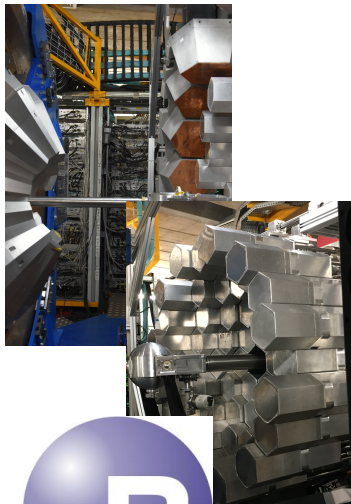
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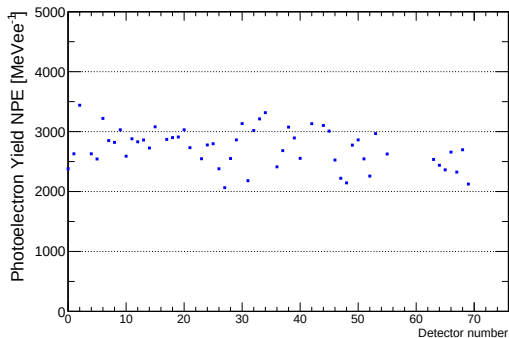
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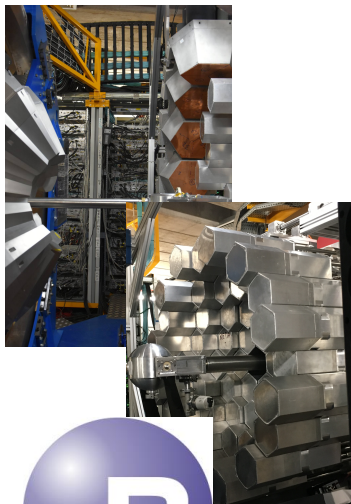
■ High quality home made detectors

■ $\epsilon_{1n} \sim 30\%$

■ J.J. Valiente-Dobón et al. NIM A **927** (2019) 81



The NEDA-NeutronWall array @ LNL



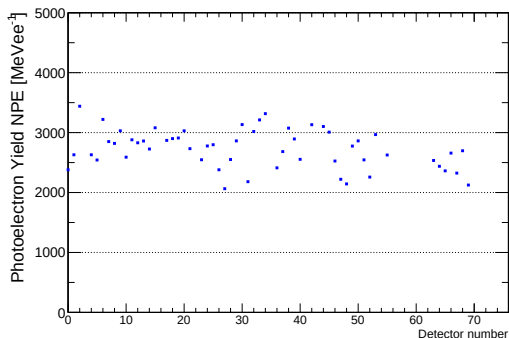
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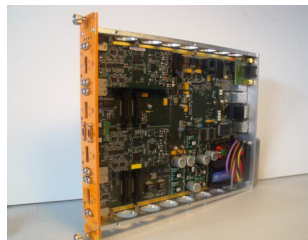
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The NEDA FEE: NUMEXO2

NUMEXO2 Digitizers:

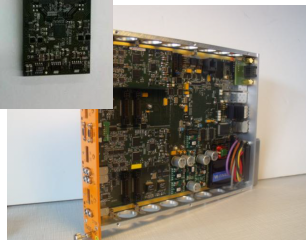
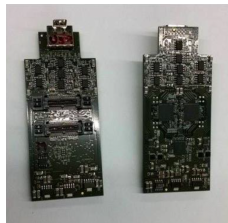
- 16 channels NIM modules:
 - 4 differential channels / mezzanine



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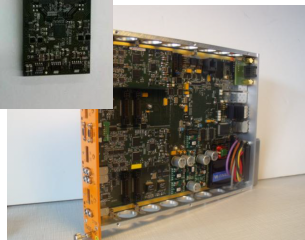
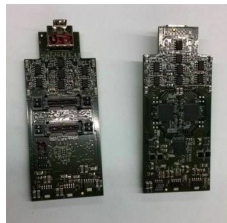
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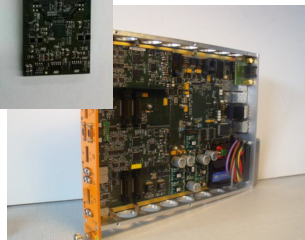
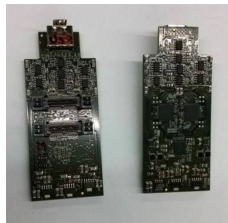
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- Programmable FPGAs:
 - Signal processing: Xilinx Virtex6
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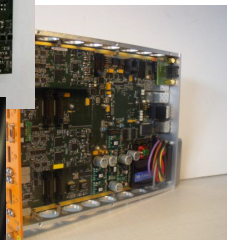
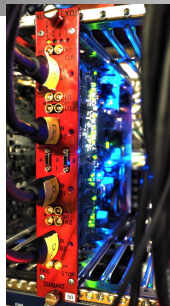
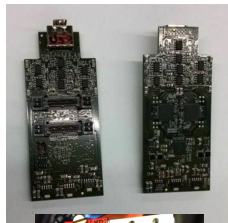
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 - Optical Fiber (⇒ NEDA)



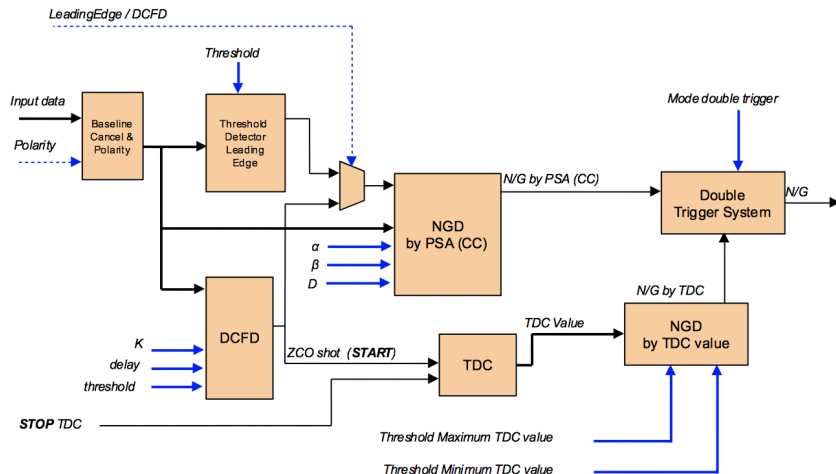
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- GTS leaf implementation

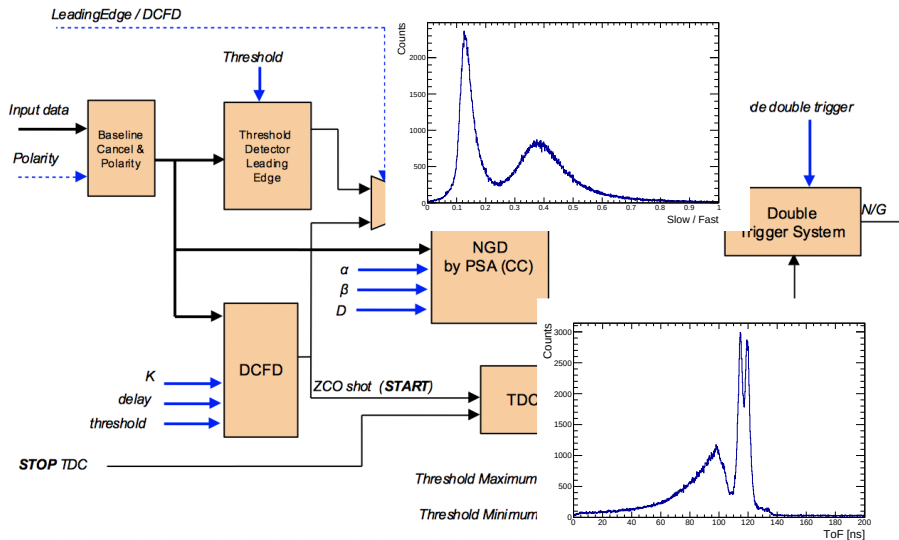


The NEDA Virtex 6 firmware



Courtesy of J. M. Deltoro

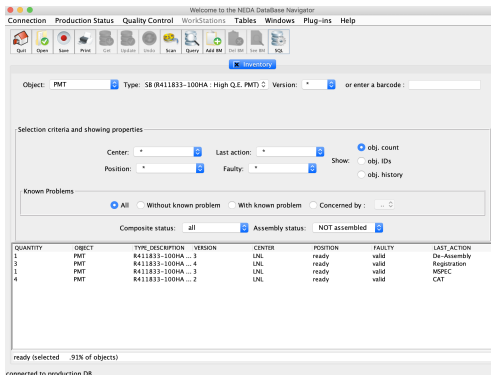
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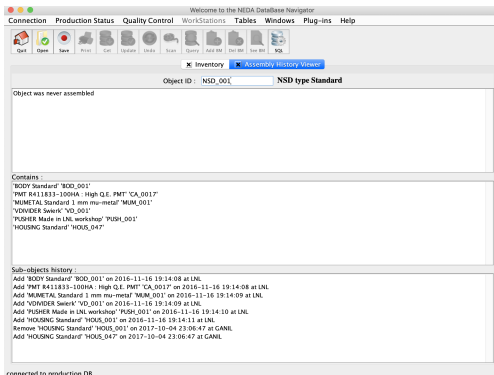
NEDA is using the database presented by C. Aufranc

- Complete descriptions of all parts of NEDA (cables, mechanics, servers, ...)



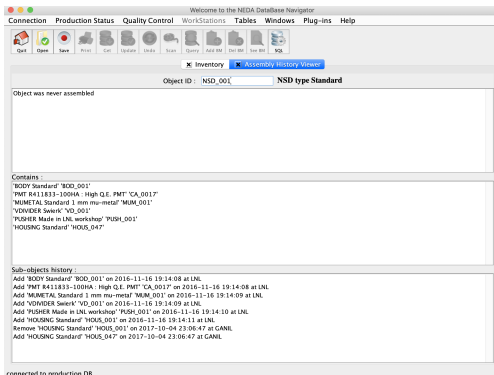
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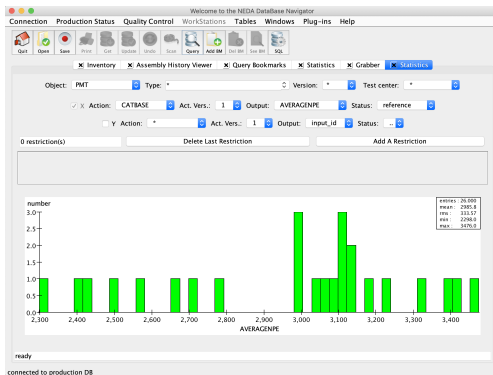
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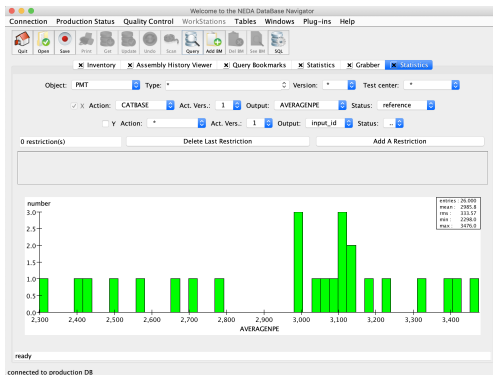
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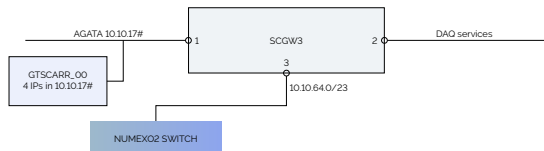
NEDA Acquisition for the Legnaro campaigns



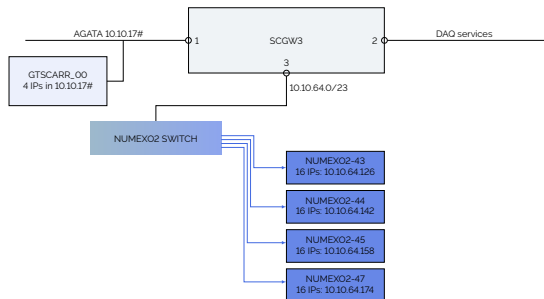
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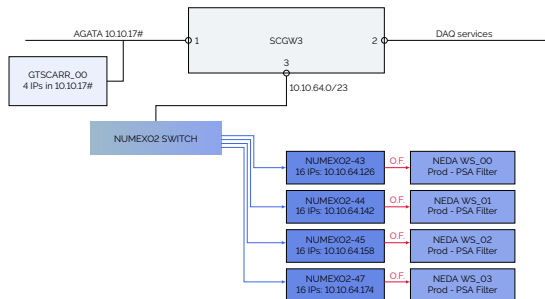
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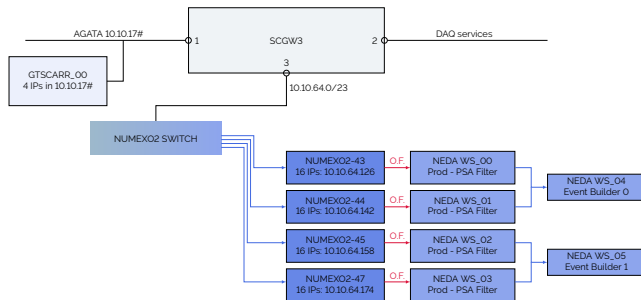
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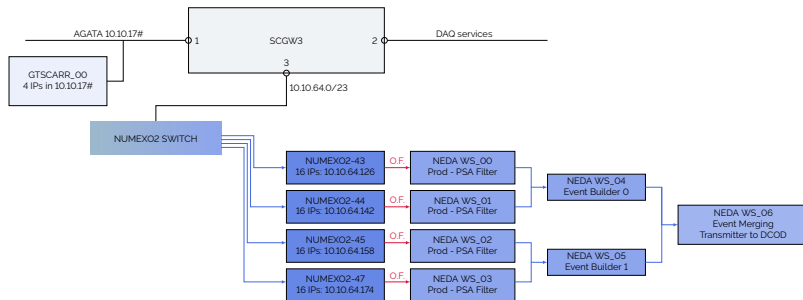
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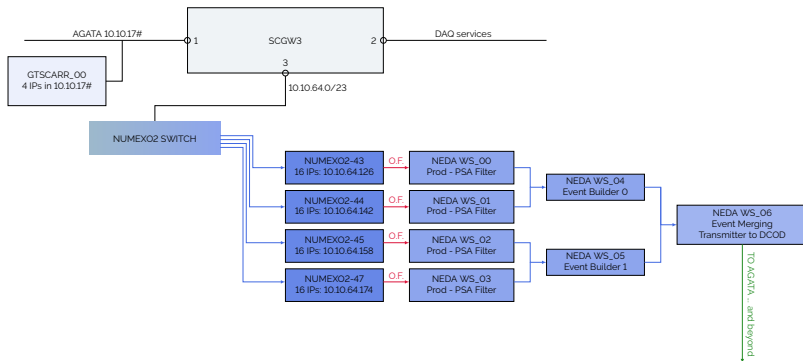
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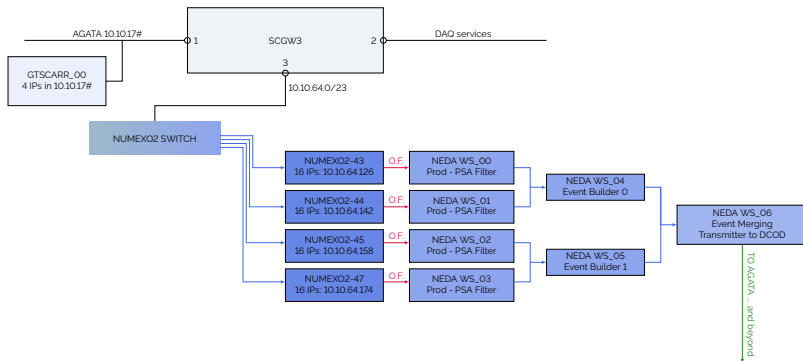
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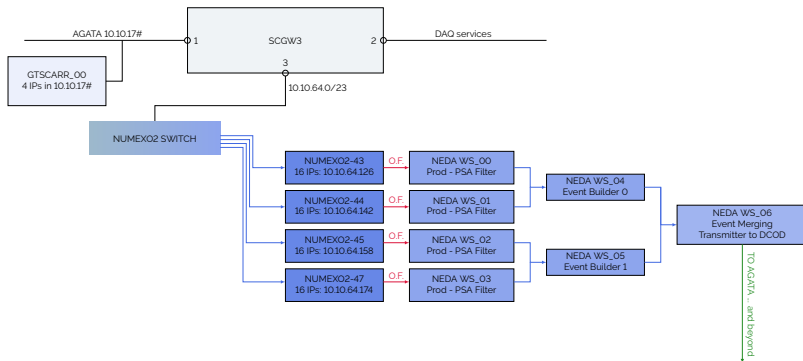


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To be installed in the hall:

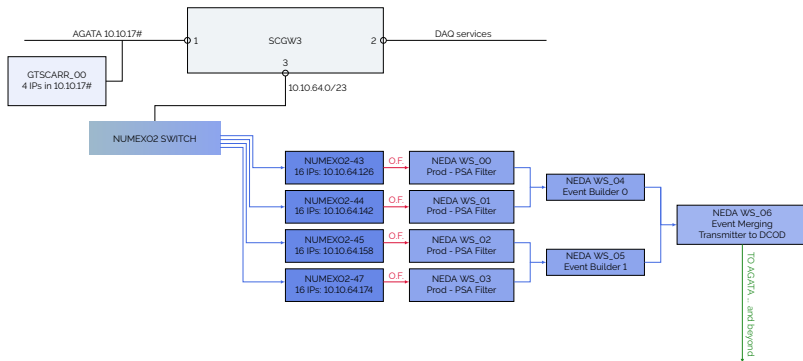
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To be installed in the hall:

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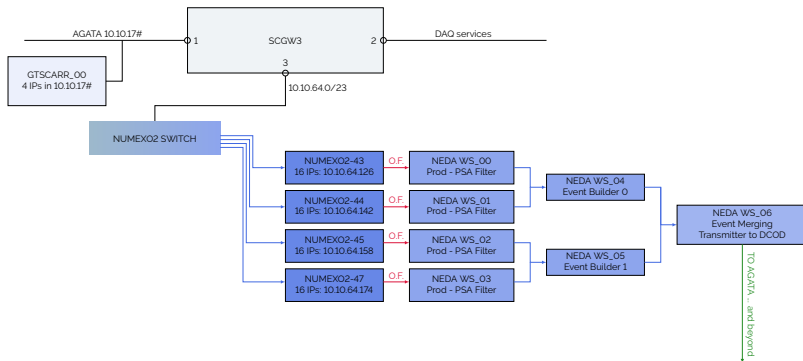
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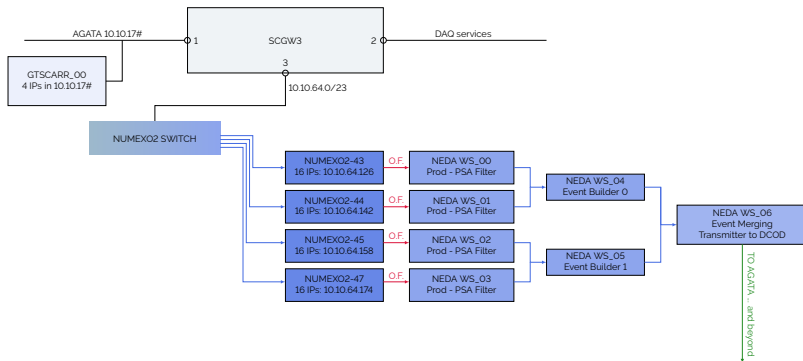
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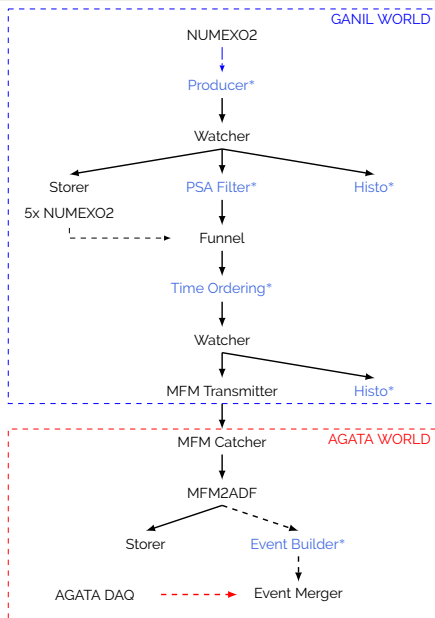
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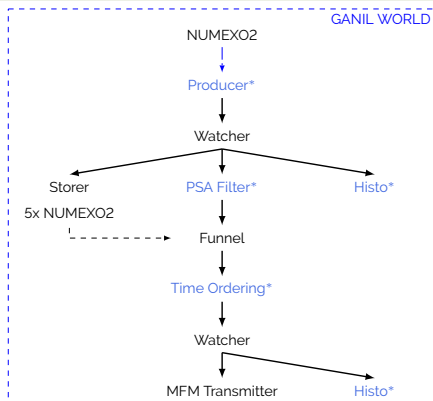
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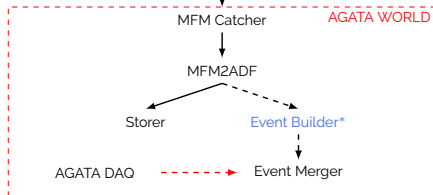
Data Acquisition - NEDA@GANIL



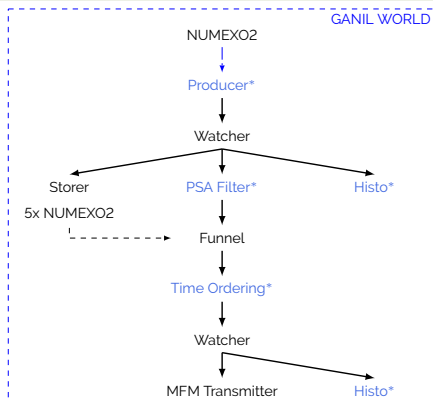
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Expected rates for the typical experiment:
~ 180 Hz / detector / 1 pA (1 γ -1n trigger)
⇒ ~ 1.5 MB/s of traces / board

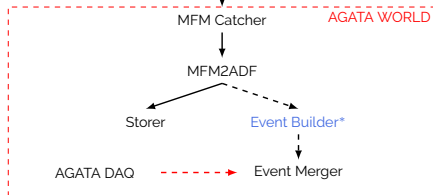


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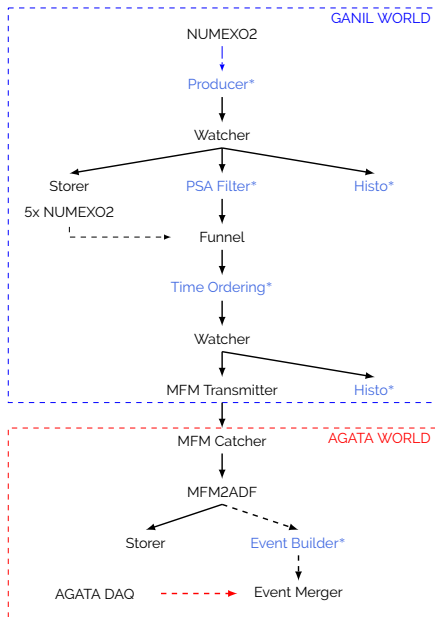


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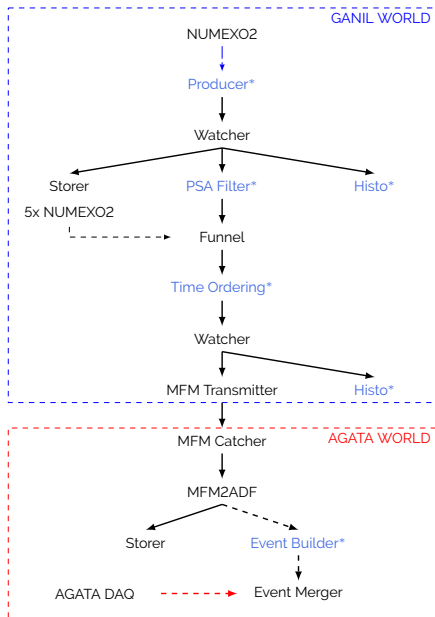
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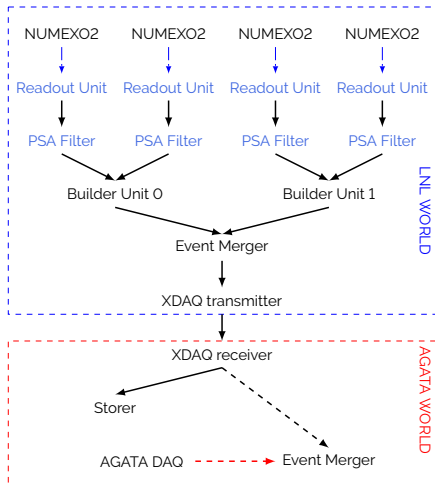
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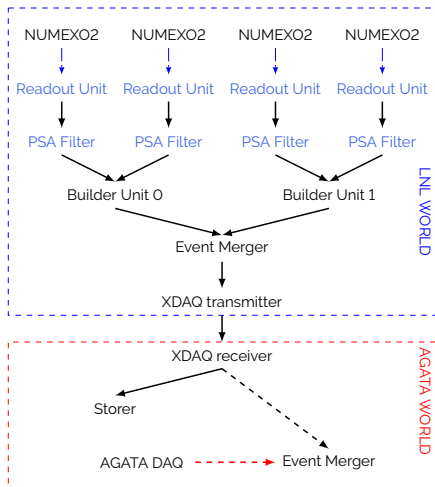
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TP Validations: About 50-60 % of the neutrons
 $\Rightarrow$ ~ 1.6 MB/s of traces (/board)
 $\Rightarrow$ ~ 0.15 MB/s of post-PSA
 $\Rightarrow$ ~ 0.24 MB/s on ADF Storer

Data Acquisition - NEDA@LNL

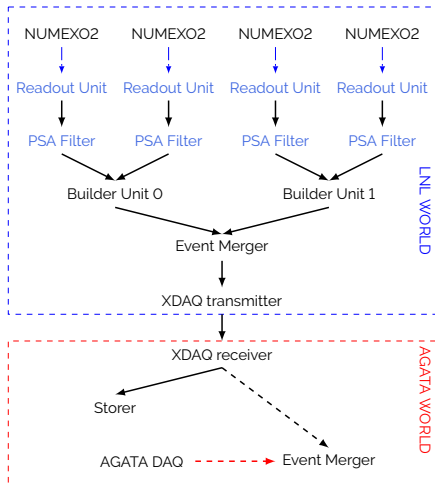


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Modifications/Improvements from the GANIL phase:

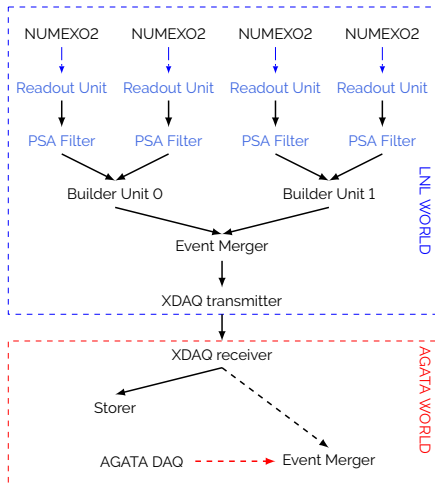
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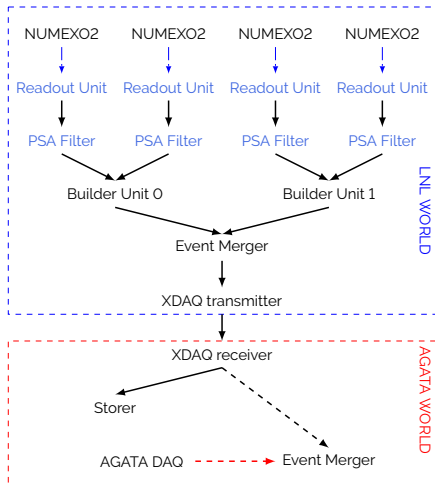
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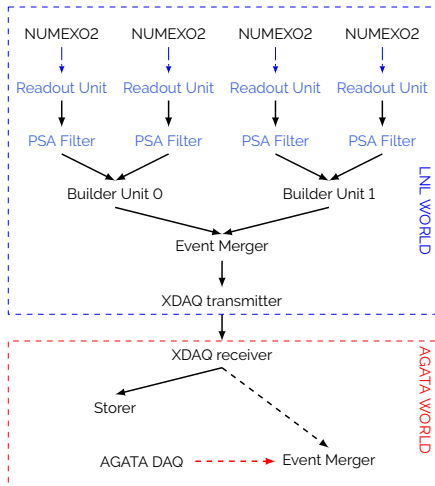
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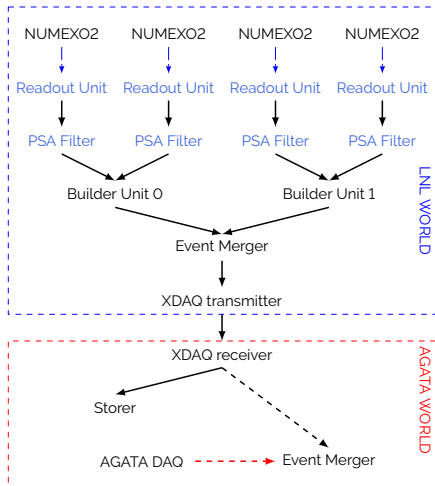
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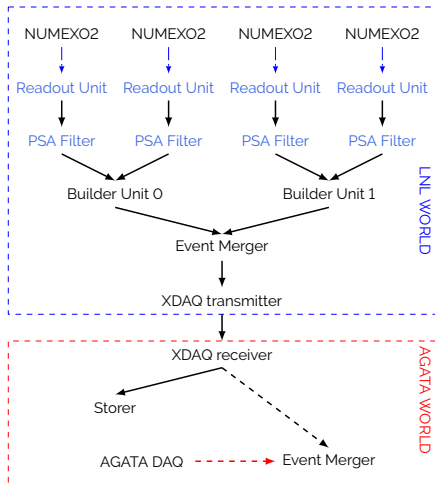
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- Interface XDAQ - DCOD

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Conclusions

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- Communication XDAQ - DCOD

Work in progress ... see presentation of A. Goasduff on XDAQ

Thank you for your attention

Thanks to the AGATA and NEDA Collaborations