
Full Sim production

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General comments

- Last production was run using the new web interface
 - A **huge** step forward wrt the previous exercise
 - Easy to use
 - Flexible
 - High level of support
- Actual job submission was managed by some superposition of simulation core (EP+ADS) and production team (AF+LT)
 - A non negligible amount of work, not to be underestimated for future (larger) productions
- Apart from physics results, production was an important benchmark for our software
 - performances were very good (above expectations, honestly)

full-fast

- ~10e6 bgframes were produced
 - RadBhabha
 - Particles recorded at special scoring volume as agreed with fast sim
 - Only neutrons are propagated beyond the scoring volume
 - Products of their interactions are saved in the output file for fast sim
- A bug in Bruno was found which was duplicating some information related to the neutron interactions
 - Unfortunately, too late for production
 - Luckily, it's just duplication: no corruption nor omission
 - An offline correction has been implemented, and the input to fast sime already patched to remove the extra information

GENERAL MOTIVATION

- Background rates are key quantities for the SuperB detector design.
- The most worrisome background term is the one scaling with luminosity ($\times 100$):
Radiative Bhabha is the process with the highest cross section, i.e. rate.

MOTIVATION OF THE WINTER PRODUCTION

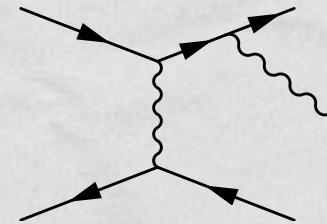
- Requested from the IFR people to evaluate rates on a finer length scale (IFR instrumented surface 100 m²): 100
- Other detectors took profit of the possibilities:
 - EMC: bkg neutral clusters / event
 - TOF: electron/photon fluxes
 - DCH: occupancies
 - IFR: neutron damages

SIMULATION VALIDATION

- 3 sets generated with running cut off parameters:

$$e^+ e^- \rightarrow e^+ e^- \gamma \quad (\gamma \sim \parallel e^-)$$

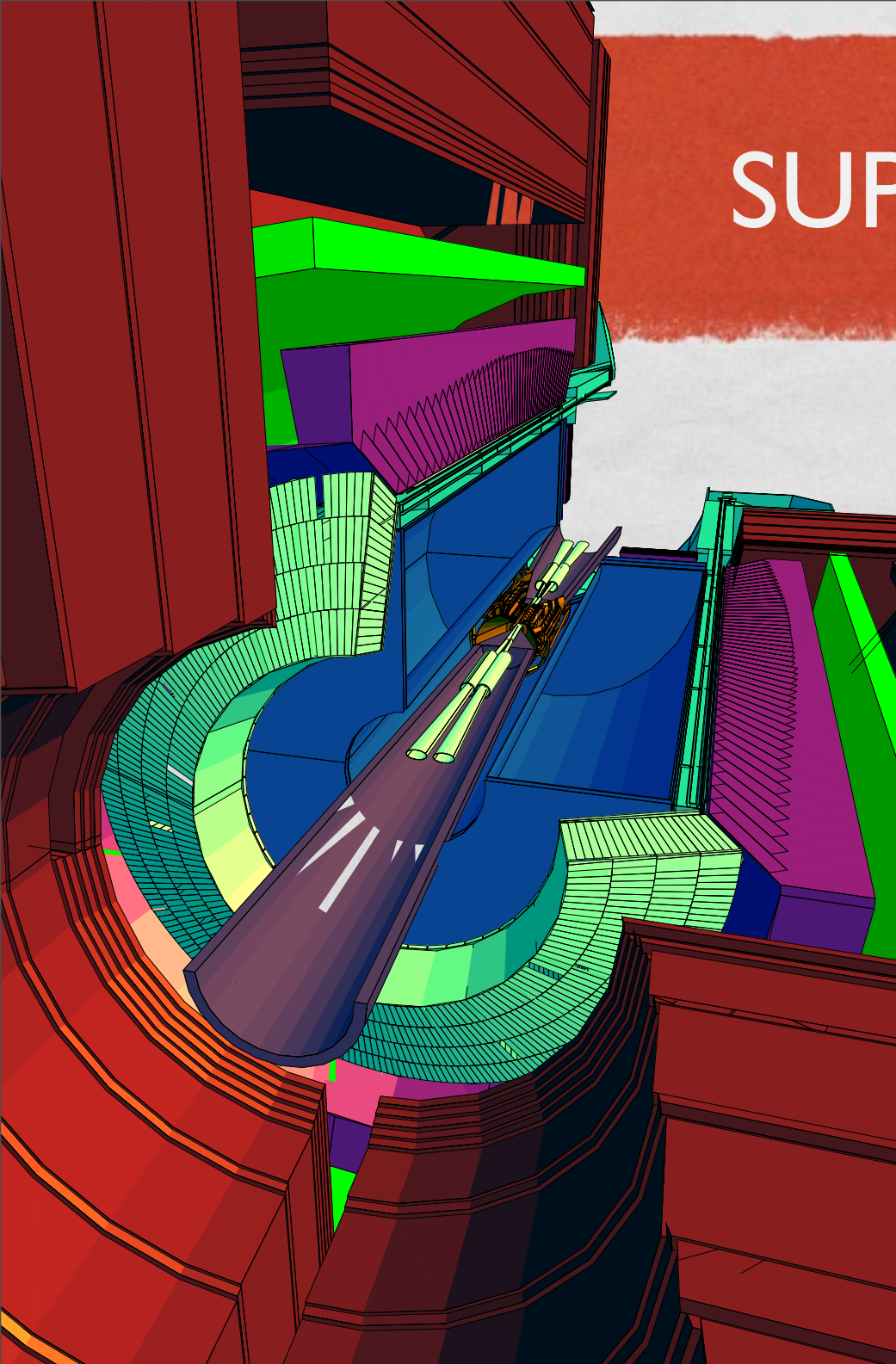
$$\Delta E \equiv \frac{E_\gamma}{E_{beam}} \rightarrow 0 \quad (\sigma \rightarrow \infty)$$



$$\Delta E \in \{10\%, 5\%, 0.2\%\}$$

- Physics is better approximated by smaller Delta E (longer CPU time, as usual)
- 2 Physics lists compared (High Precision neutron, vs. QGSP_BERT)

SUPERB

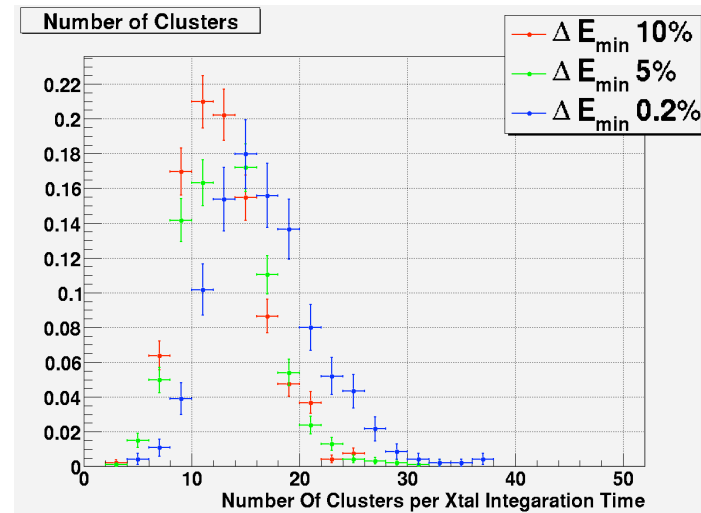
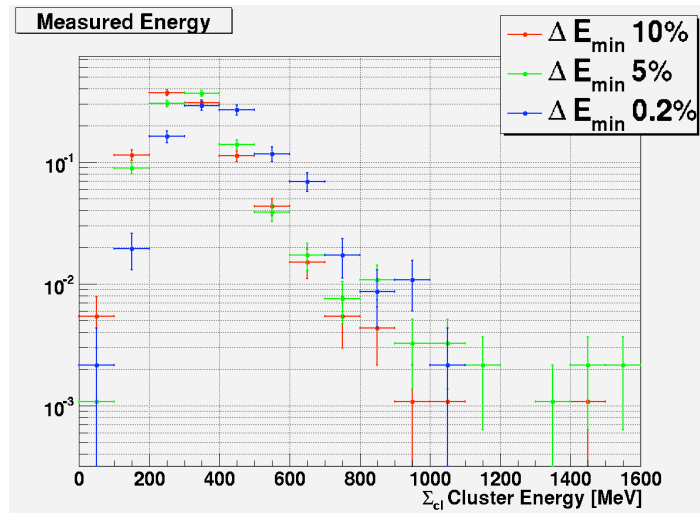


- 2 options simulated:
- beam line shielded by a 3 cm thick Tungsten blanket
- naked beam line :
(DCH occupancies unsustainable)

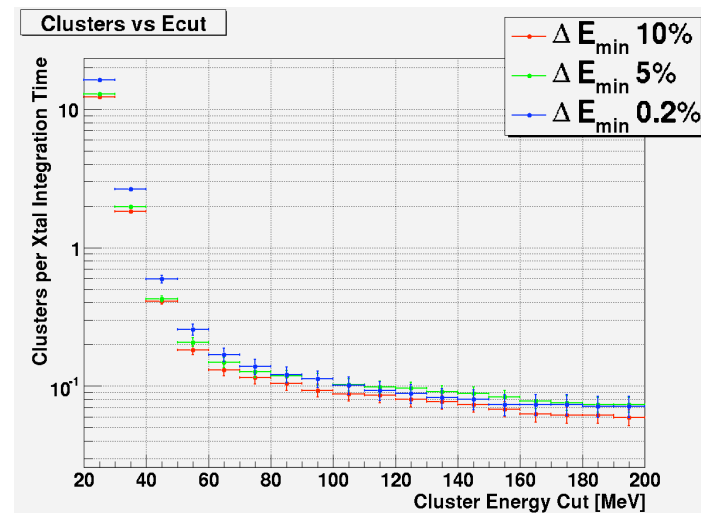
RESULTS DO DEPEND ON DELTA E :(



Delta Emin : Clusters



- There is a significant difference between the 10% and 0.2% cuts
- Need to check what happens at lower cut energies

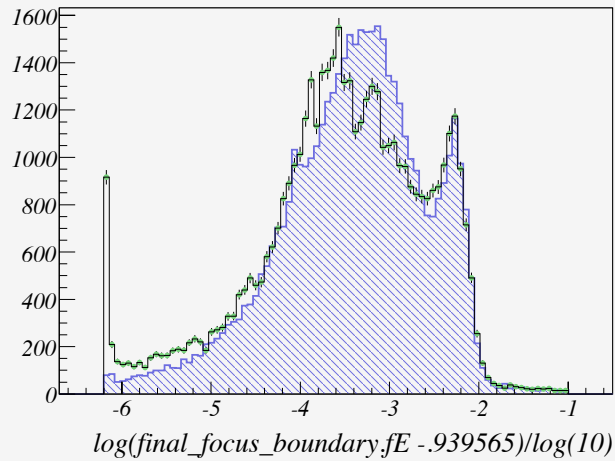


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EMC Background Studies

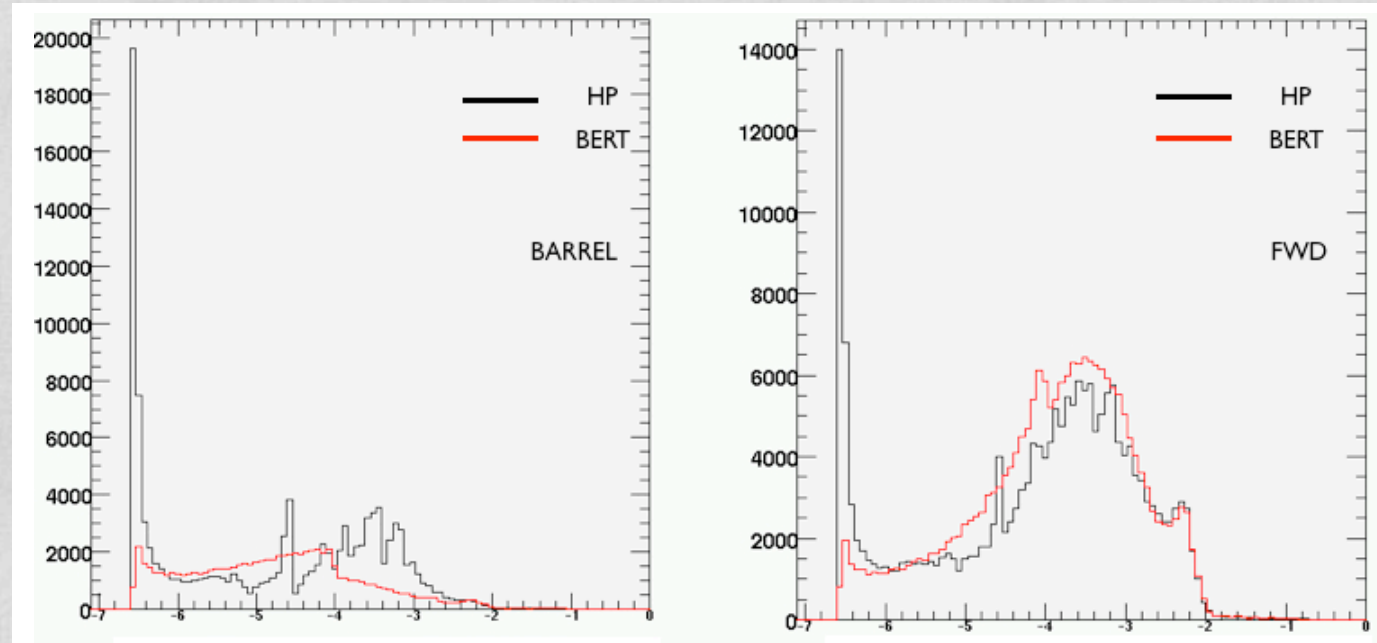
S. Germani

PHYSICS LIST COMPARISON



Neutron energy spectrum at the final focus boundary: High precision neutron in green, QGSP in violet

Neutron energy spectrum at the IFR boundary: High precision neutron in black, QGSP in red



PRODUCTION

- Dealing with Isf at the good old times was a real nightmare.
- The web interface is a piece of cake.
- It is not idiot proof (I proved it ;))

SUGGESTIONS/REQUESTS

- Dedicated “producer” account instead of personal user accounts
- standard output and standard error should be merged (keeping a copy of the standard error alone, redirection / tee /indentation ? should be possible with bash)
- Production series definition: I would like to have a bigger set of parameters fixed by the production series, namely the unphysical parameters.