Simulation Update and Plans

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ALICE Offline Week, November 26, 2015

G4 Developments since last Offline Week
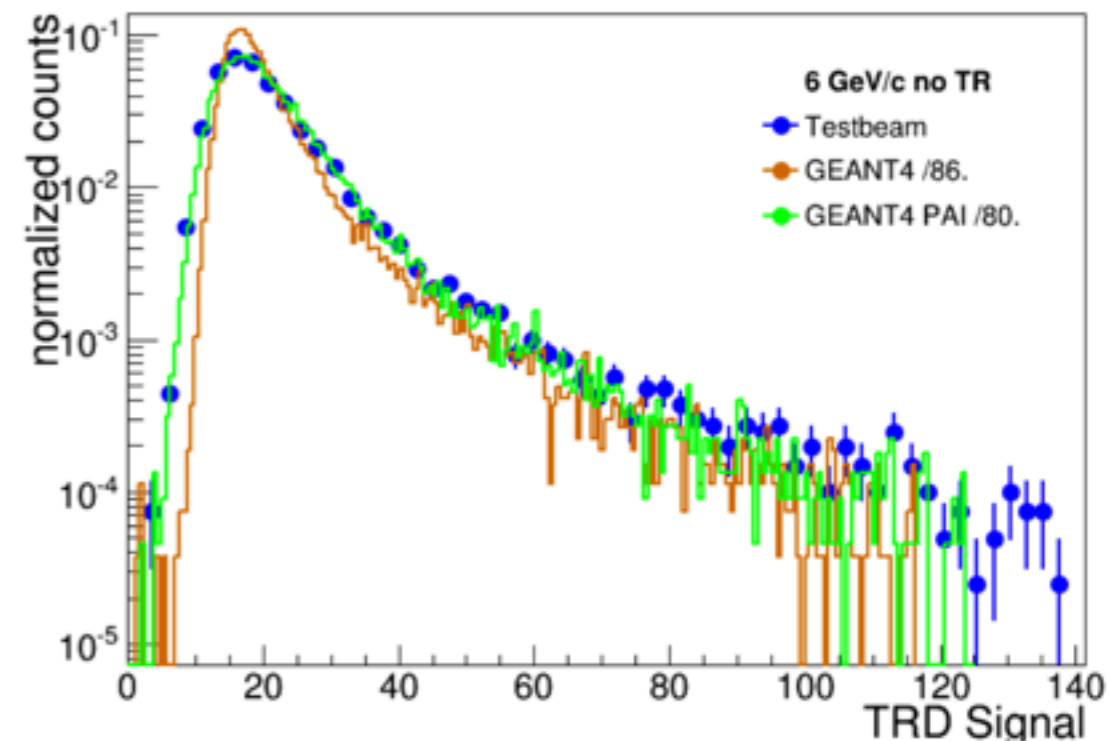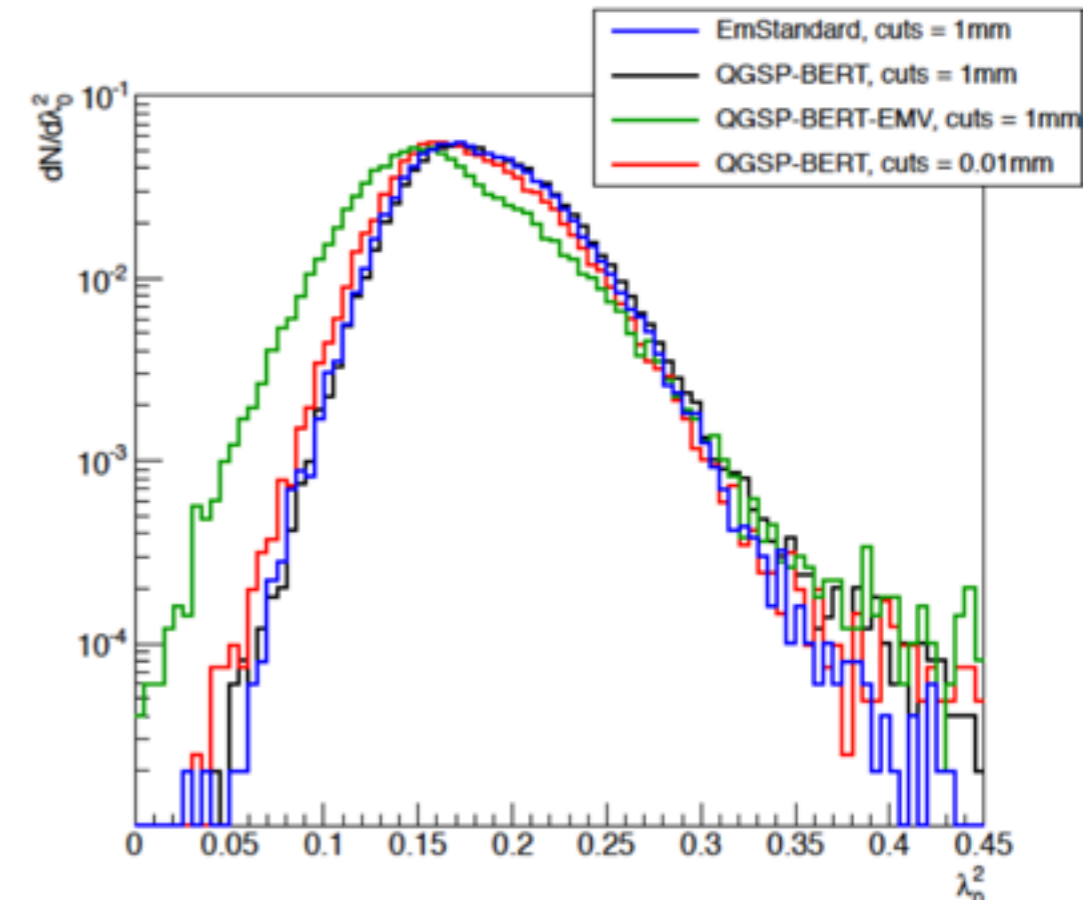
- Calorimeters

  - Possibility to use fast electromagnetic physics option (EMV) for all detectors except calorimeters

    - wrong shower shapes with EMV (see last offline week)

- dE/dx in TRD

  - Use PAI model

 - Adjust scaling factor between dE/dx and TRD signal

- Navigation

  - frequent crashes in G4MultiLevelLocator

  - G4 patch to avoid fatal exception
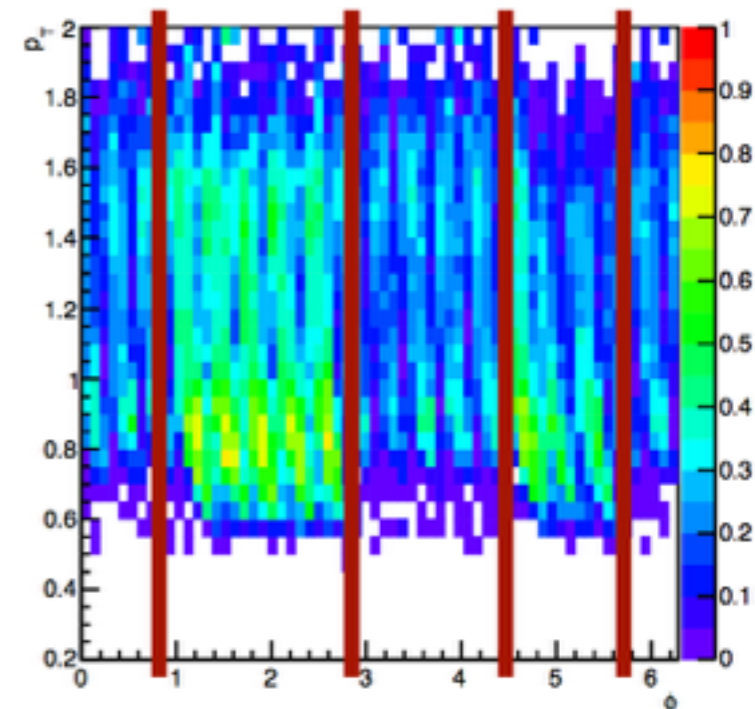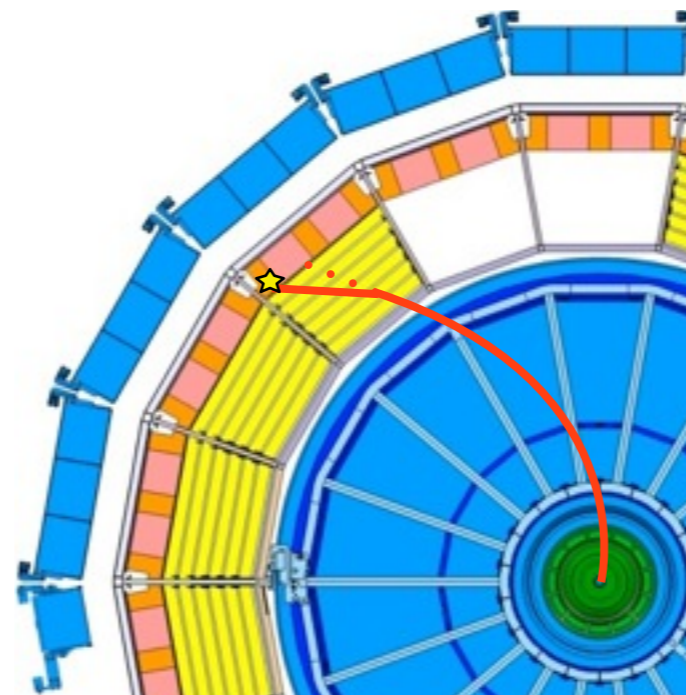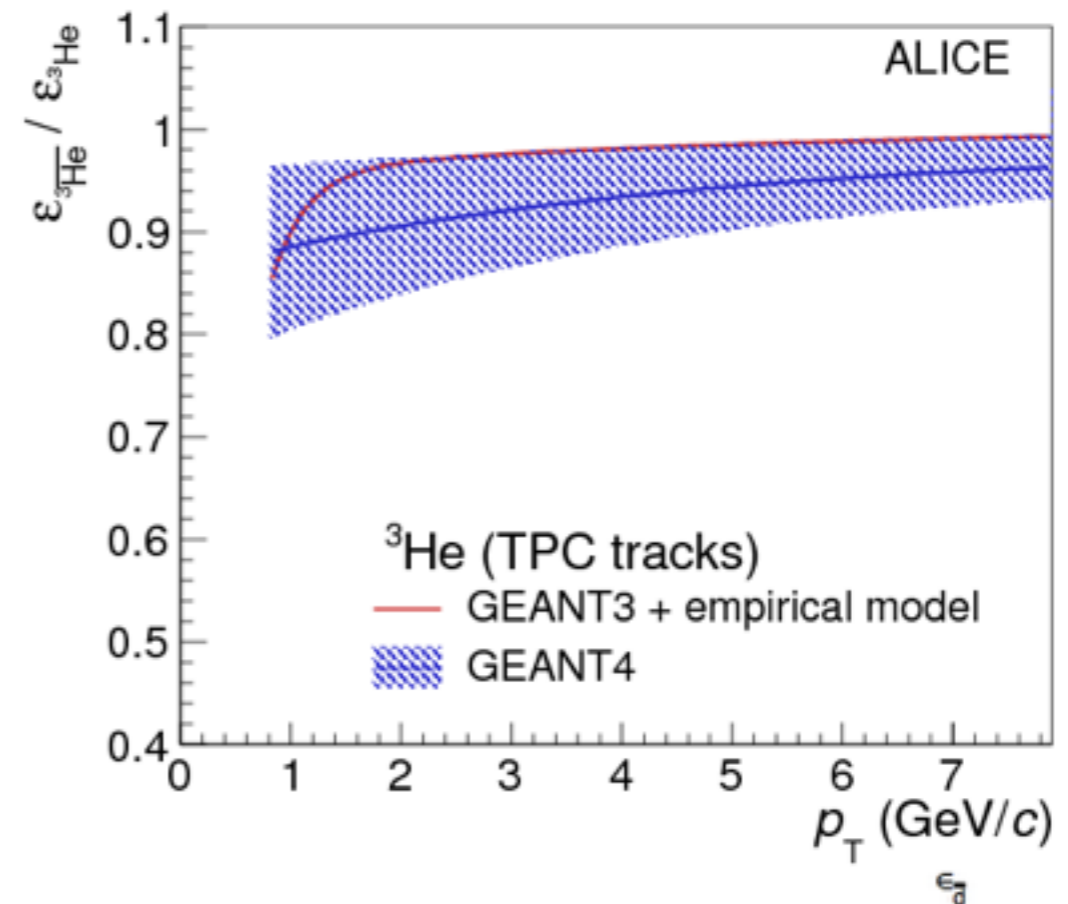
Geant4 in Production

GEANT4 and anti-nuclei (1)

- The physics of (anti-)nuclei has evolved from a side topic to one of the major efforts in ALICE:

  - 4 papers submitted only this year and many more in the pipeline!

  - Ambitious plans for run 2 and one of the cornerstones of the physics programme of run 3.

- Propagation of anti-nuclei remains a challenge:

  - missing constraints from data

  - cross-sections are large

  - Both inelastic and elastic hadronic play an important role.

  - Also the modelling of the final state in elastic hadronic scattering is crucial.

A. Kalweit
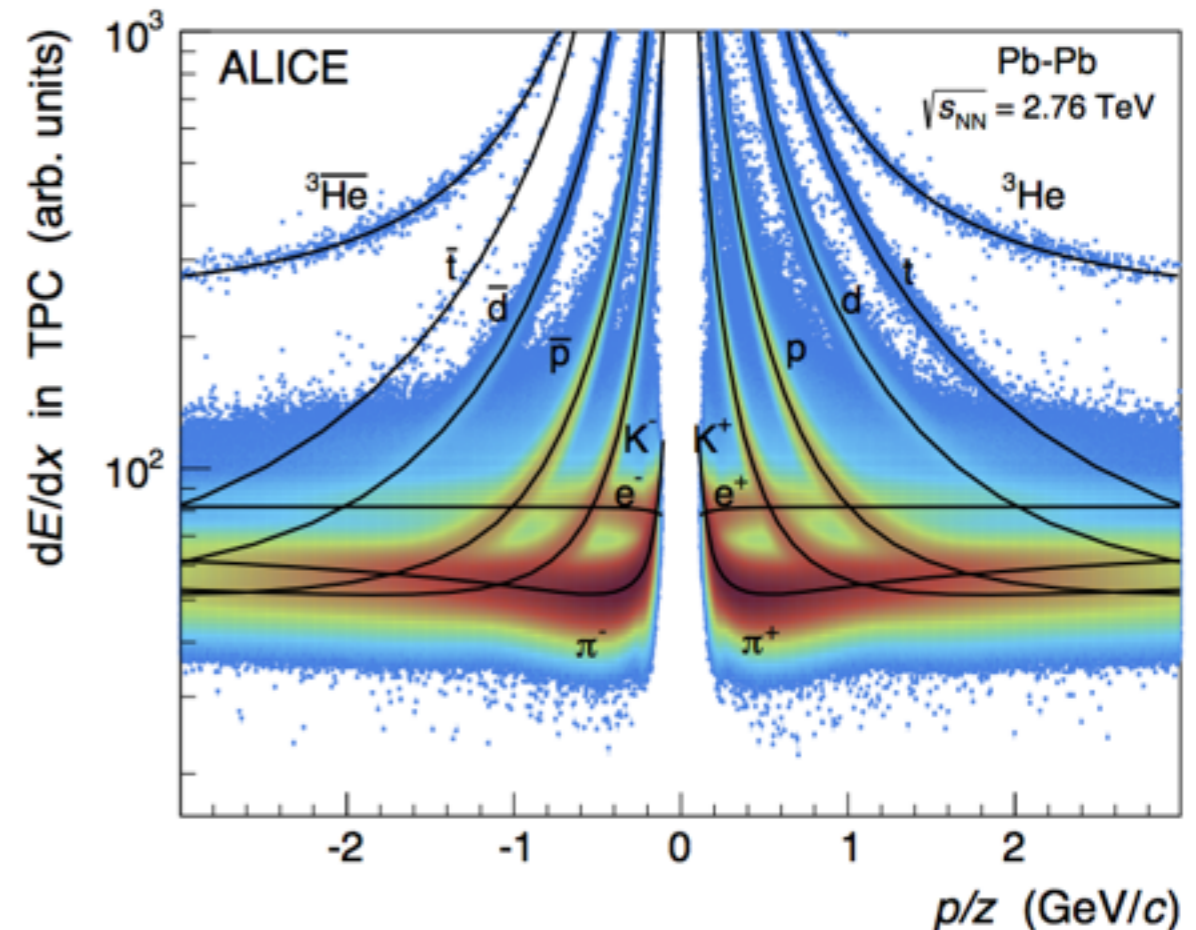
GEANT4 and anti-nuclei (2)

- Geant4 is the only code that offers the best available model at the moment (also used by e.g. AMS).

- Several recent successful small productions for the systematic study of hadronic interaction effects which were used in the publications: e.g. LHC15g7 and LHC15b2_32.

- By studying absorption effects in the material between TPC and TOF, we might be able to improve the modelling in collaboration with the GEANT4 crew (Alexander is in contact with Alberto Ribon) in order to reduce the systematic uncertainties.

from M. Puccio

Open Issues

- TPC PID Calibration

    - G3 now reproduces MIP position in data

    - G3/G4 ~ 1.05
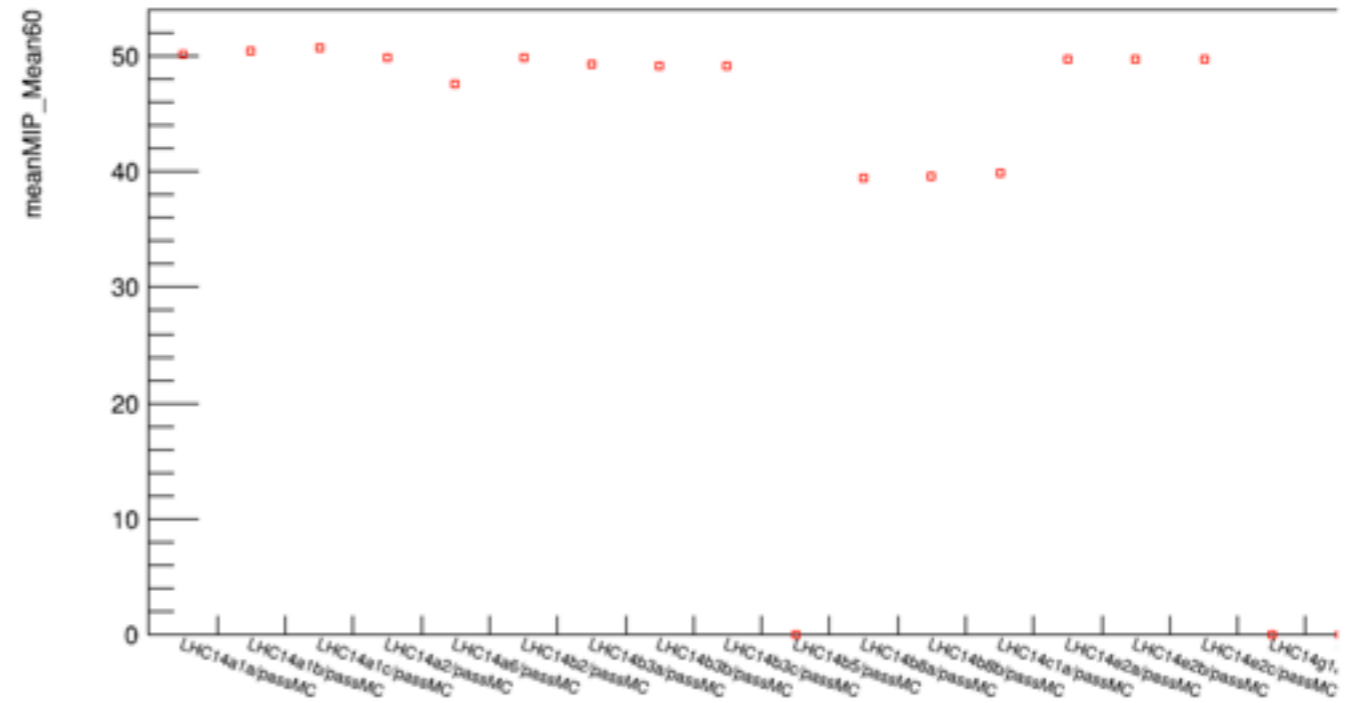
Open Issues

- Geant4 validation production anchored to LHC10 pass4

    - ALIROOT-6127

    - delayed due to activities with higher priorities

- Investigation of possible G4 computing time gain with static libraries

Future Activities (PWG-PP or Data Preparation)

- More systematic validation of simulation performance comparing to data

    - unfold effects from

        - transport code

        - and response simulation (including OCDB)

        - primary particle generation

    - documentation

- Identify areas in which the gain for decrease of systematic errors in analysis is largest

- Feedback to MC authors

- Tuning

Future Activities
(Fast Simulation CWG8)

- Integration of fast simulation code (J. Stiller, tracking) into VMC framework

    - combination of fast and slow simulation

    - to be discussed

- Evaluate G4 fast simulation framework