

The ALICE Performance Report

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For the ALICE Collaboration

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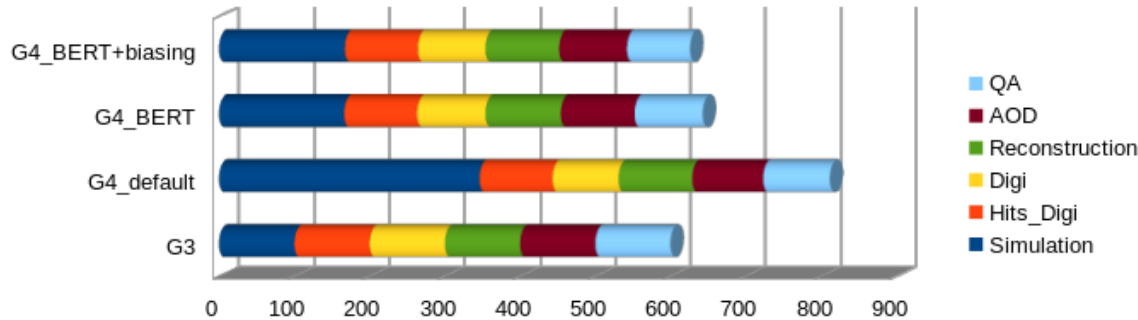


ALICE performance studies for G4

- As reported in the [previous G4 Collaboration meeting](#), ALICE had to move from the default FTFP_BERT_EMV to the FTFP_INCLXX_EMV physics list in order to better reproduce the data and G3 performance in terms of light nuclei (d, t, 3He) → ~20% slowdown was observed
- A new Geant4 example, provided by A.Ribon, shows how to use "generic biasing" to get the combination FTFP+INCLXX for the inelastic interactions of nucleons and pions in one part only of the detector, while using the FTFP_BERT in a detector.
 - We use the powerful "generic biasing" machinery available in Geant4, but the actual weights of all tracks remain to the usual value (1.0) as in the normal (unbiased) case.
- A code provided as a new Geant4 example was integrated in Geant4 VMC and then tested in the ALICE production.
 - Tests done in ALICE to verify the performance when the INCLXX list is used only in the Beam Pipe and ITS volumes (→ from where the secondary particles that produce the light nuclei originate) → "BERT+biasing" in the following
 - Geant4 version: 10.04.p02

Results - I

Each stage of the simulation chain (simulation with transport, digitization (from hits or sdigits), reconstruction, AOD creation and QA) was checked over 5.5 Mio events where different transport codes were used.



G4_default: FTFP_INCLXX_EMV
G4_BERT: FTFP_BERT_EMV
G4_BERT+biasing: FTFP_BERT_EMV + FTFP+INCLXX in selected regions

Each stage is normalized by the time it took in the G3 case (ALICE default transport)

While all following stages look comparable, the INCLXX (default ALICE G4 list) shows ~2x slower performance (expected) than BERT

BERT+biasing is comparable to BERT, slower by ~65% than G3 (and overall by ~20%)

Results - II

- Tracking detector QA (including ITS, TPC, TOF) did not spot any performance difference among the 4 cycles (G3, G4 INCLXX, G4 BERT, G4 BERT+biasing)
- Analysis QA for the light nuclei showed that G4BERT+biasing performs as INCLXX → right solution for ALICE needs, also in view of O2

