

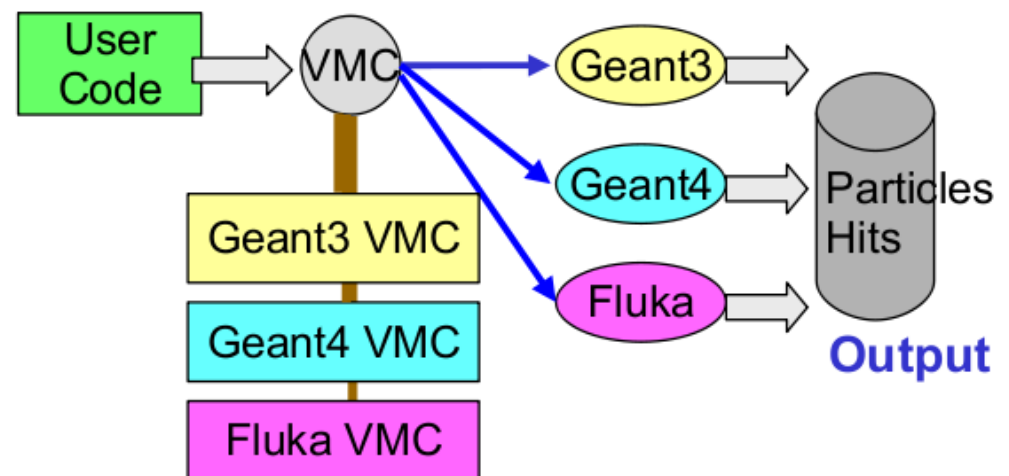
ALICE

Geant4 Experience and Requirements

Andreas Morsch
Geant4 TF
Nov. 16, 2010

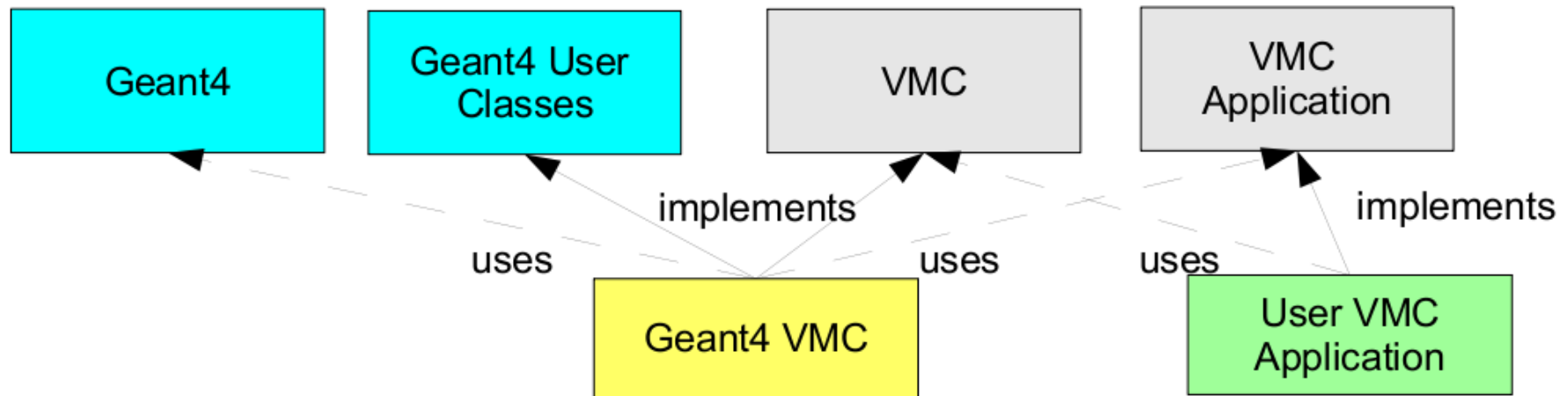
Virtual Monte Carlo

- ALICE has developed in the close collaboration with the ROOT team the Virtual Monte Carlo interface:
 - First, it allowed a smooth transition from GEANT3 based FORTRAN code to C++ and then it made possible to run the same code with three transport codes: GEANT3, Geant4 and FLUKA
- The VMC is distributed with ROOT since 2002 and now it is used in more experimental frameworks
 - <http://root.cern.ch/drupal/content/vmc>



Geant4 VMC

- Geant4 VMC implements:
 - TVirtualMC interface - via calls to the Geant4 objects
 - Geant4 user classes - via calls to the VMC application interface



- Geant4 VMC is distributed as a stand-alone package via ROOT site
 - <http://root.cern.ch/drupal/content/geant4-vmc>

The GRID: Build system

- The BITS (Build Integration and Testing System) provides a systematic and uniform process for compiling and packaging distributions for ALICE.
- The package configuration (the specific versions of included software and environment setting) is defined on the first build

geant4 [top](#)

Package	Version	Status	Prepare	Make	-install	-test	-cache	-autopkg	Files	License	Built on	Build time
clhep	2.0.4.5_1	✓	OK	OK	OK	N/A	OK	OK	10MB	CLHEP	Wed Oct 6 23:06:21 2010	00:01:13
geant4	9.3.p02_1	✓	OK	OK	OK	N/A	OK	OK	344MB	GEANT	Wed Oct 6 23:15:28 2010	00:09:07
geant4_vmc	2.10_3	✓	OK	OK	OK	N/A	OK	OK	382MB	ROOT	Fri Oct 8 02:08:31 2010	00:03:00

- In subsequent rebuilds of the package, all relevant dependencies are then installed automatically by the build system

Package	Version	Status	Prepare	Make	-install	-test	-cache	-autopkg	Files	License	Built on	Build time
geant4_vmc	2.10_3	✓	OK	OK	OK	N/A	OK	OK	382MB	ROOT	Tue Oct 12 02:34:52 2010	00:02:51


Package dependencies: [top](#)

geant4	9.3.p02_1	✓	OK	OK	OK	N/A	OK	OK	344MB	GEANT	Sun Oct 10 02:17:39 2010	00:14:11	
root	5-27-06_3	✓	OK	OK	OK	N/A	OK	OK	969MB	ROOT	Tue Oct 12 02:20:57 2010	00:15:08	
Total	2 pkgs	2	2	2	2	2	2 n/a	2	2	1GB	2	Tue Oct 12 02:20:57 2010	00:29:19

The GRID: Deployment

- The distribution is built on various platforms and deployed on the ALICE GRID through the centralized AliEn (ALICE Environment) package manager.
- GRID users then simply specify the distribution version they want to use in their job description.
- Alternatively, using an automated script, users can install any available Geant4 distribution and its ROOT dependency on their local machine.

Packages available in Grid

Package name	Dependencies	Install 
VO_ALICE@AliRoot:v4-18-Rev-23	VO_ALICE@ROOT::v5-26-00b-6,VO_ALICE@GEANT3::v1-11-12	Linux
VO_ALICE@AliRoot:v4-19-Rev-10	VO_ALICE@ROOT::v5-27-05-build3,VO_ALICE@GEANT3::v1-11-14	Linux
VO_ALICE@GEANT3:v1-11-14		Linux
VO_ALICE@GEANT3:v1-11-15		Linux
VO_ALICE@GEANT4:v9.3.p02_vmc.2.10	VO_ALICE@ROOT::v5-27-06	Linux
VO_ALICE@GEANT4:v9.3.p02_vmc.Rev512	VO_ALICE@ROOT::v5-26-00b-6	Linux

Central Productions on the GRID

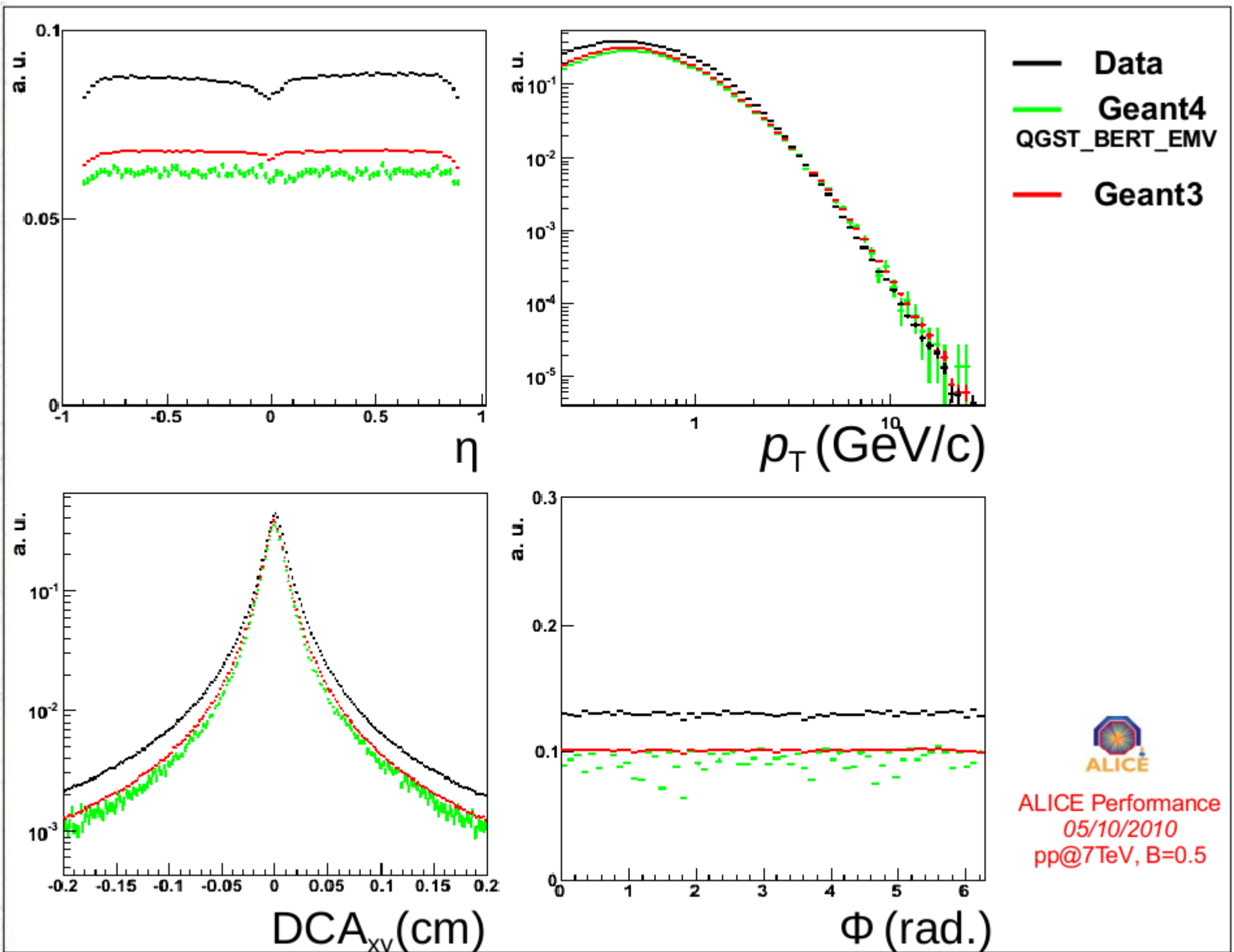
MonALISA Repository for ALICE

[My jobs](#) ★ | [My home dir](#) ★ | [Catalogue browser](#) ★ | [Repository Home](#) | [Administration Section](#) | [ALICE Reports](#) | [Events XML Feed](#) | [Firefox Toolbar](#) | [MonaLisa GUI](#)

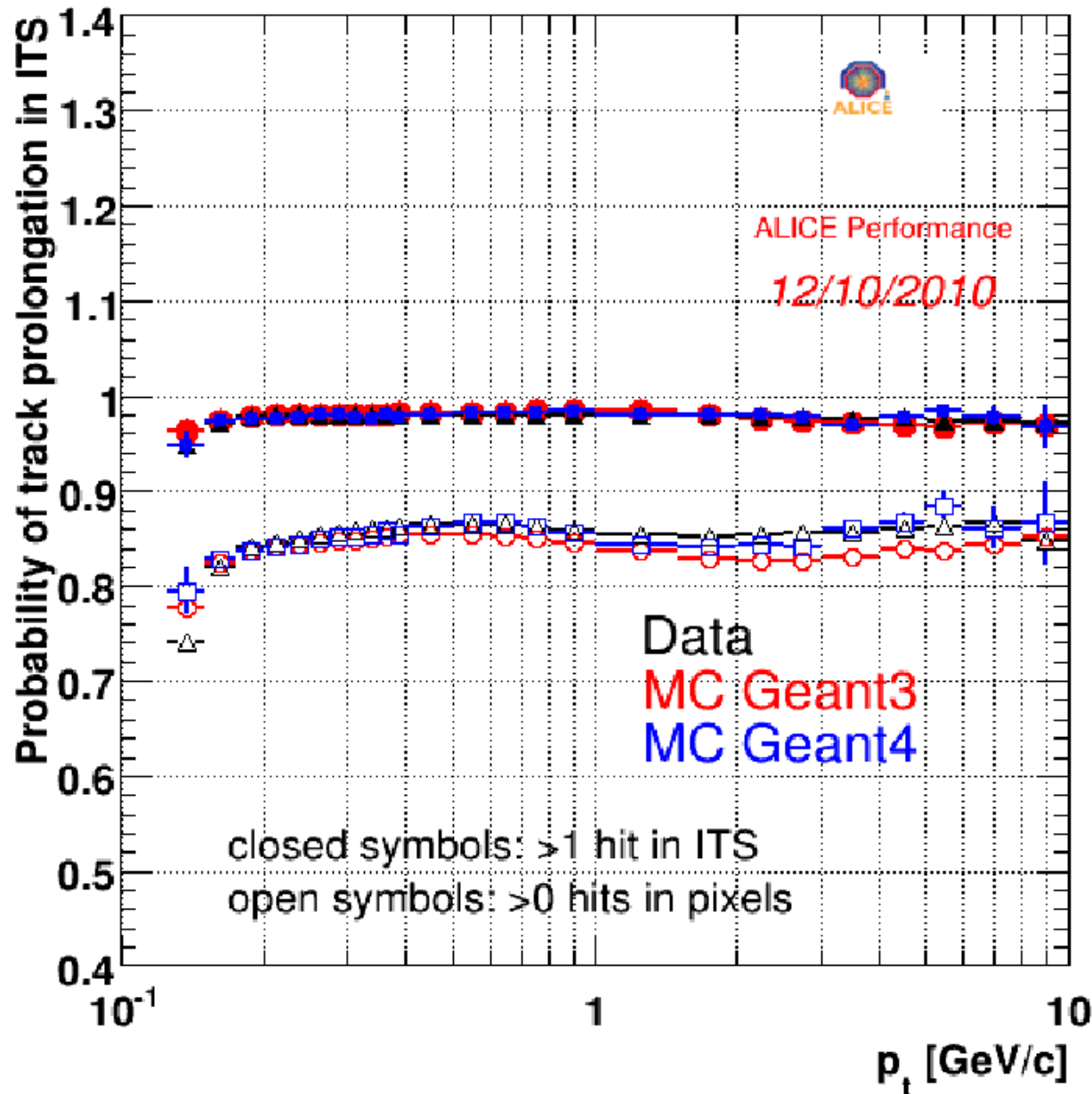
PRODUCTION CYCLES

Job Details » No filter

Production	Description		Status	Run range	Event Count
LHC10f6a	pp, Pythia, 0.5T, 7 TeV, LHC10d anchor runs, ID #225		Running	126407-126437	22,440,000
LHC10f9b	Test Geant4 simulation, pp, Pythia Perugia-0, 0.5T, 7TeV, QGSP_BERT_EMV_OPTICAL, ID #227		Completed	119846-119846	116,900
LHC10f9a	Test Geant4 simulation, pp, Pythia Perugia-0, 0.5T, 7TeV, QGSP_BERT_EMV, ID #226		Completed	119846-119846	116,800



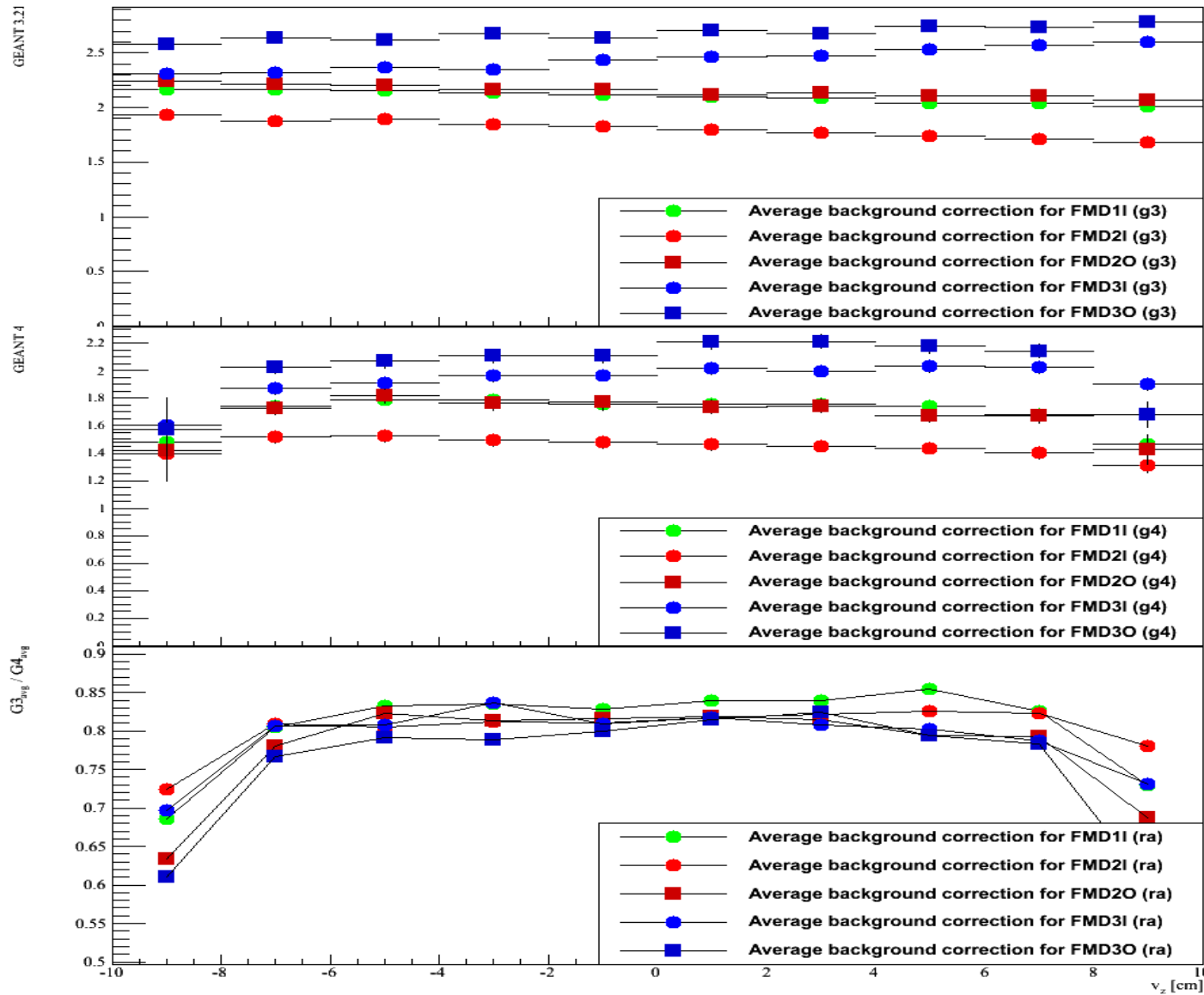
Detector Performance (1)



- Validation of Geant4 simulation by detector groups is in progress
- Most of detector groups has started the validation and some of them provided the first results

TPC-ITS prolongation efficiency

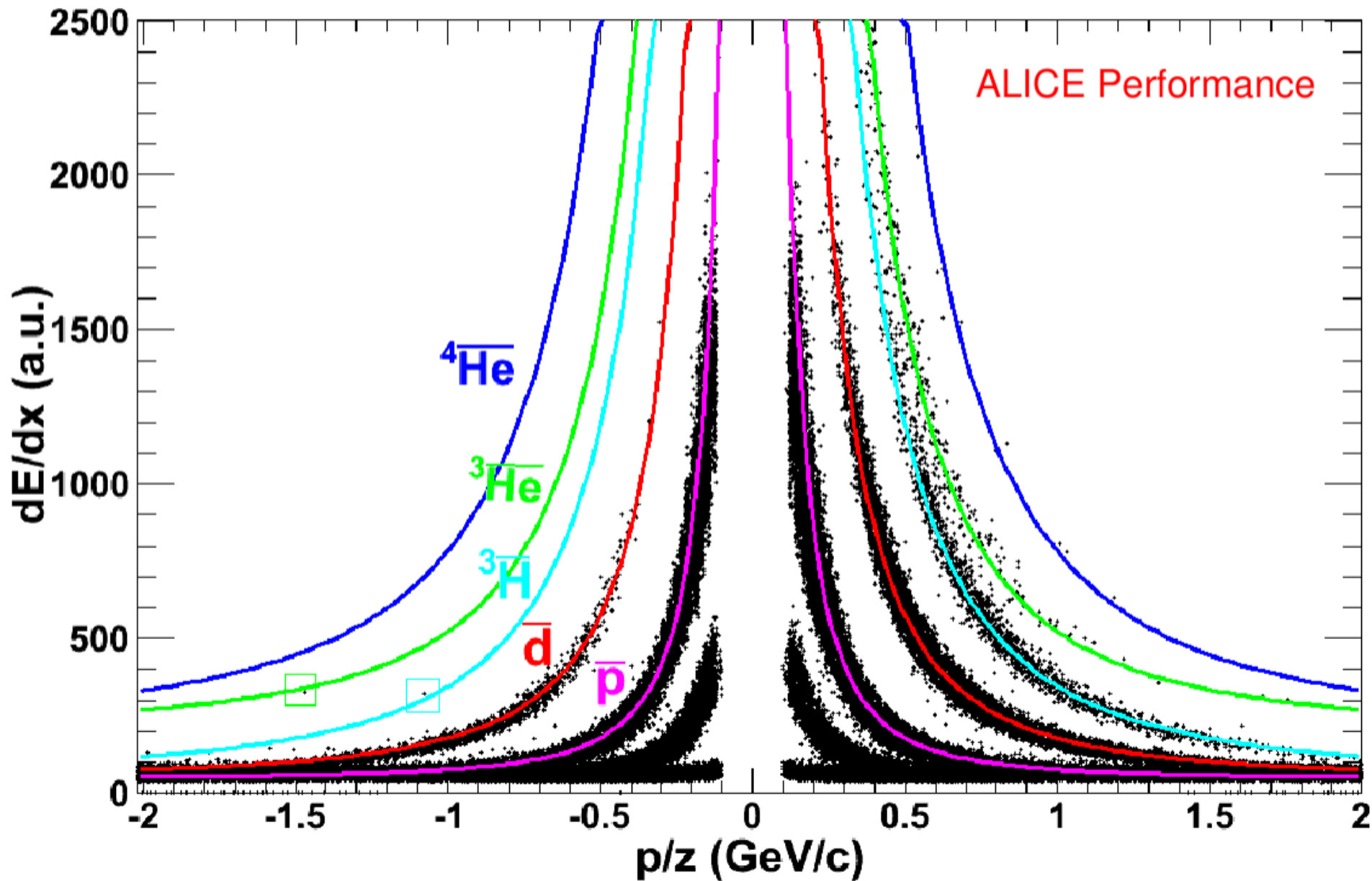
Background correction in Forward Region (1+sec/prim)



Geant3 matches data.

dE/dx distribution using pp@7TeV ALICE data

(~ 30 Millions Events)



Scope

- Light anti-ions: anti-deuteron, anti-triton, anti-He3 and anti-He4
- Energy loss, absorption, (quasi)elastic scattering
- Materials: H, C, N, O, Si, Al, ...
- Momentum range 0.1 – 4 GeV

Open Issues and Requirements

- Tracking efficiency in central barrel
- Lower secondary particle background in fwd direction
 - Need guidance on physics list for “open geometries”
- Light anti-ion transport