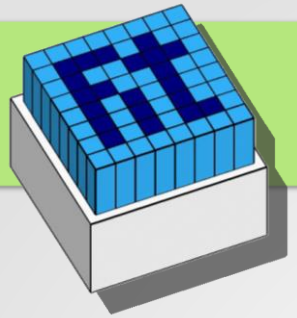


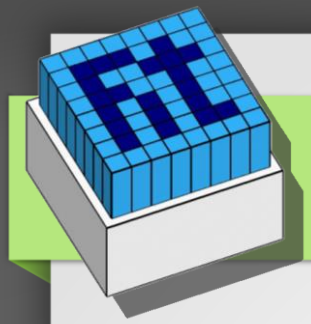
Status of FIT simulation

Alla Maevskaya for FIT team

9 November 2017
ALICE offline week

Outline

- FIT detector in ALICE
- AliRoot FIT
- O2 FIT
- Manpower and timetable



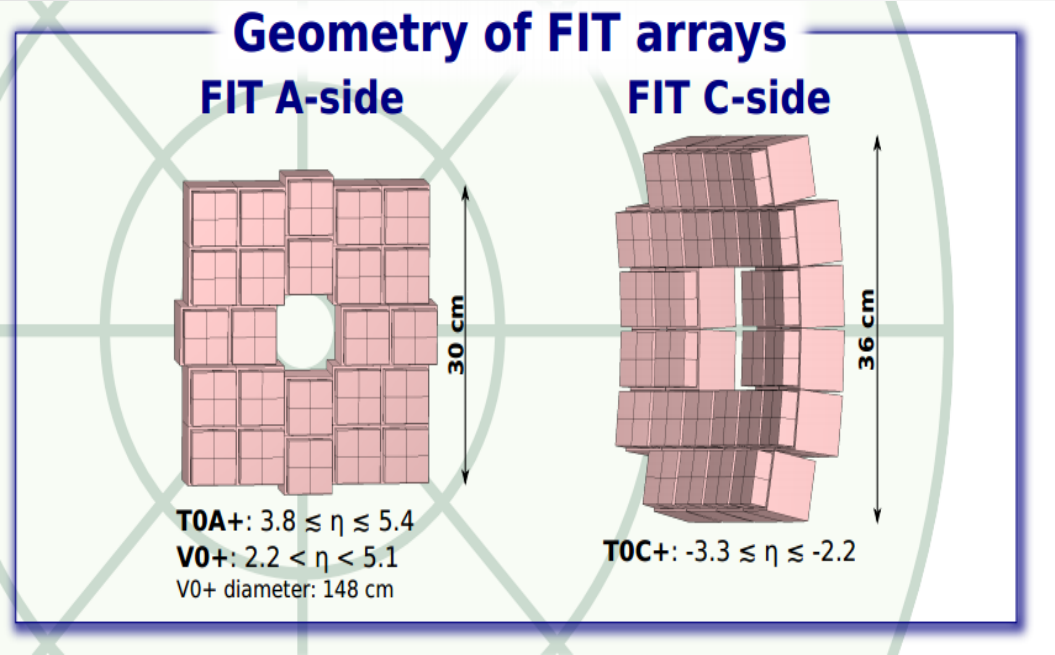
Why ALICE needs FIT:

- Luminosity **monitoring** & **feedback** to LHC
  - Essential for the operation of ALICE
- Fast Interaction **Trigger**
  - Online Vertex determination
  - Minimum Bias and centrality selection
  - Rejection of beam/gas events
  - Veto for Ultra Peripheral Collisions
- Collision **time** for Time-Of-Flight particle ID
- **Multiplicity** → **Centrality** and **Event Plane**

View from the absorber side

FIT = T0+ and V0+

FIT detector layout



FIT-T0C (EDR 26-06-2017)

- 28 modules
- Module: MCP and 4 radiators, 4 output signals
- **Total number of independent channels : 112**

FIT-T0A (EDR October-2017)

- 24 modules
- Module: MCP and 4 radiators, 4 output signals
- **Total number of independent channels : 96**

FIT-V0A (EDR October 2017)

- **Total number of independent channels : 48**

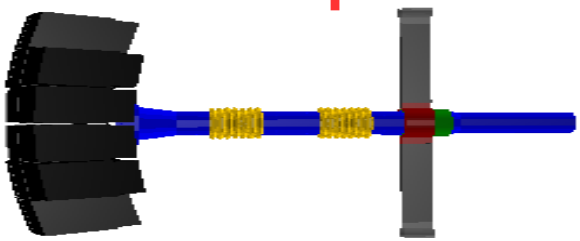
FIT performance requirements

The upgraded trigger detector needs to fulfill the following requirements:

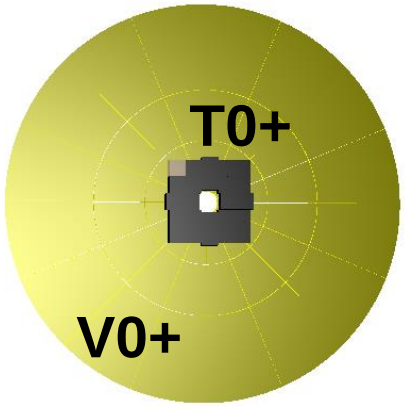
- Minimum Bias trigger for pp collisions with efficiency comparable to the current V0,
- Event Multiplicity determination capable of selecting and triggering on central as well as on semi-central collisions. The centrality selection should match the performance of the present V0.
- Vertex location with a performance comparable to the present T0 system
- Evaluation and rejection of beam-induced background and in particular beam gas event sensitivity on the level of the current V0 detector.
- Time resolution better than 50 ps for pp collisions, as in the present T0 system.
- Event plane determination with a precision similar to the present V0 system
- Minimal ageing over the ALICE Run3/Run4 operation period.
- Direct feedback to LHC on luminosity and beam conditions.

AliRoot FIT geometry

FIT-C with piece of beam pipe



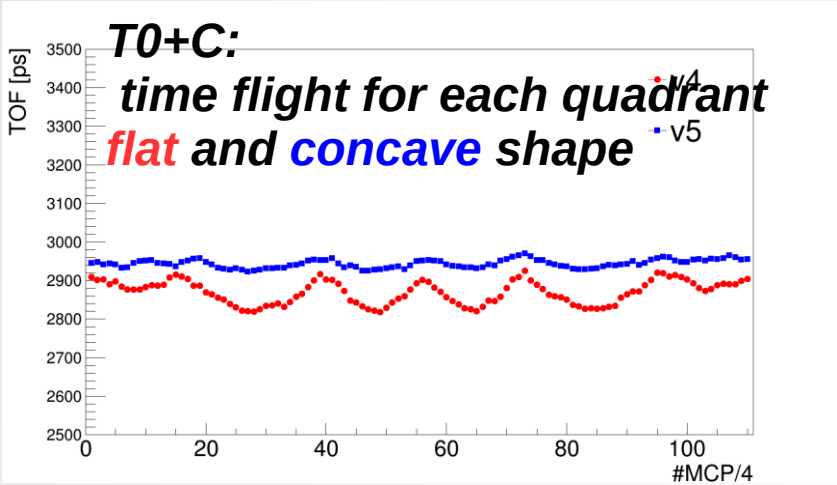
FIT-A

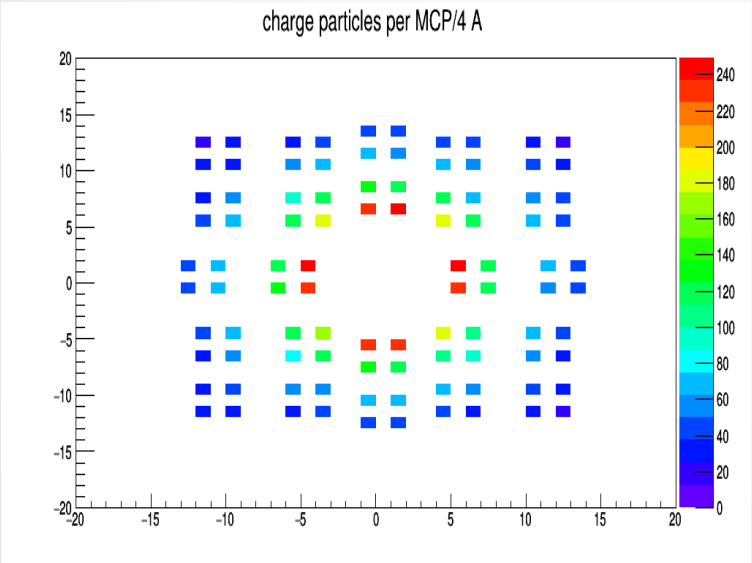


Class AliFITv7

- concave T0C+, flat T0A+;
- real T0+ radiator optical properties
- sides of each radiator are wrapped with metal reflecting surface
- MCP PMT photocathode quantum efficiency
- schematic mechanical support C side
- V0+

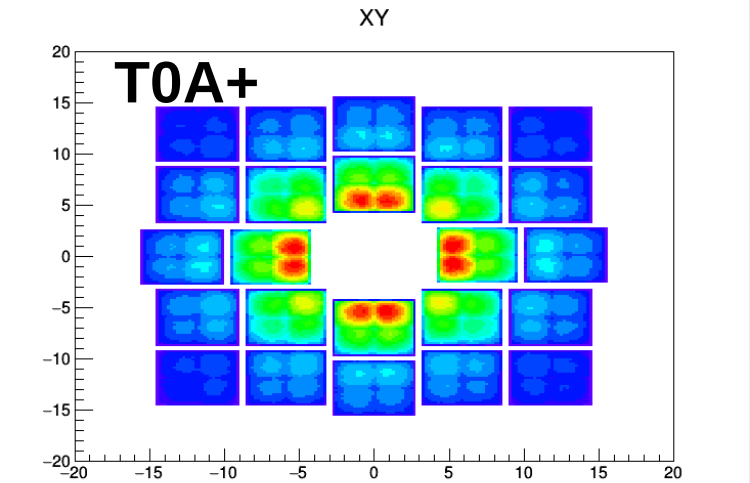
AliRoot FIT T0+

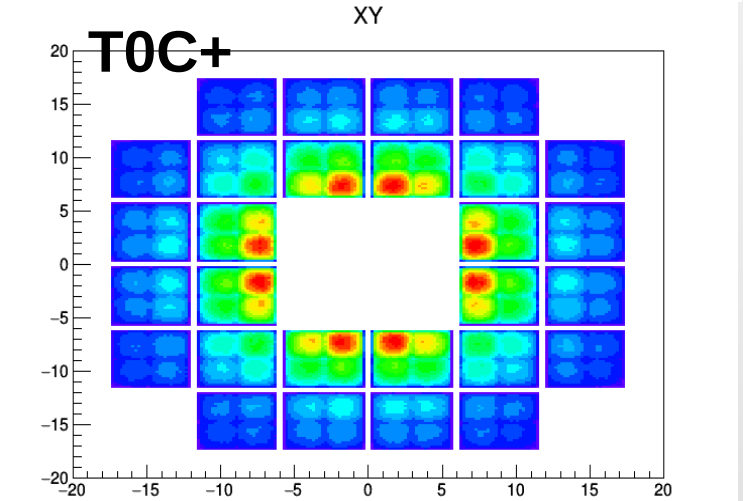




#MIPs for T0A+ for most central PbPb collisions 5.5TeV

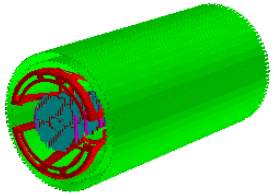
Photoelectrons distributions





O2 FIT geometry T0+ only

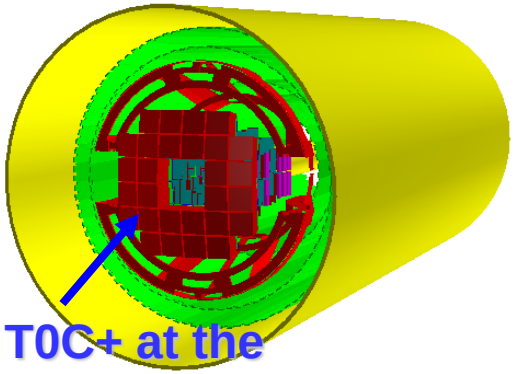
ITSMFT barrel



T0A+

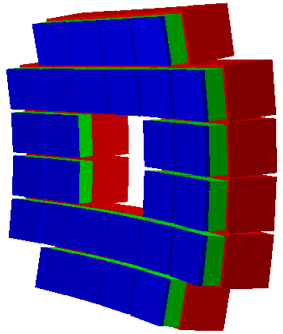
T0C+ at the bottom of MFT

ITSMFT barrel

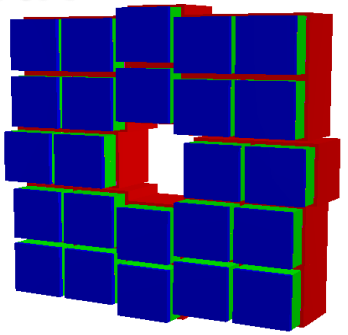


T0C+ at the bottom of MFT

T0C+



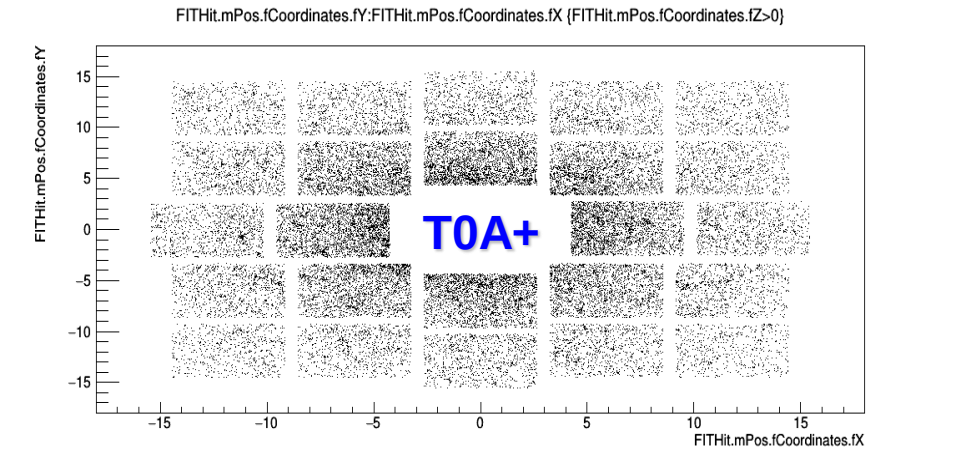
T0A+

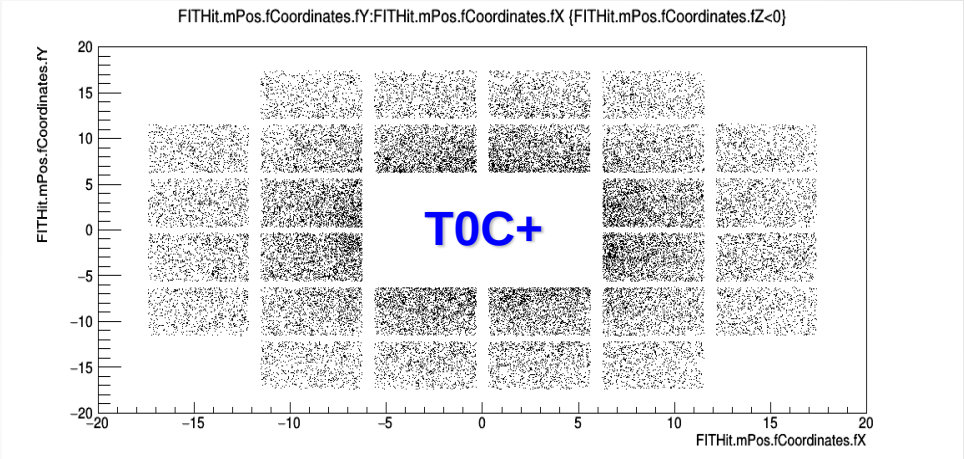


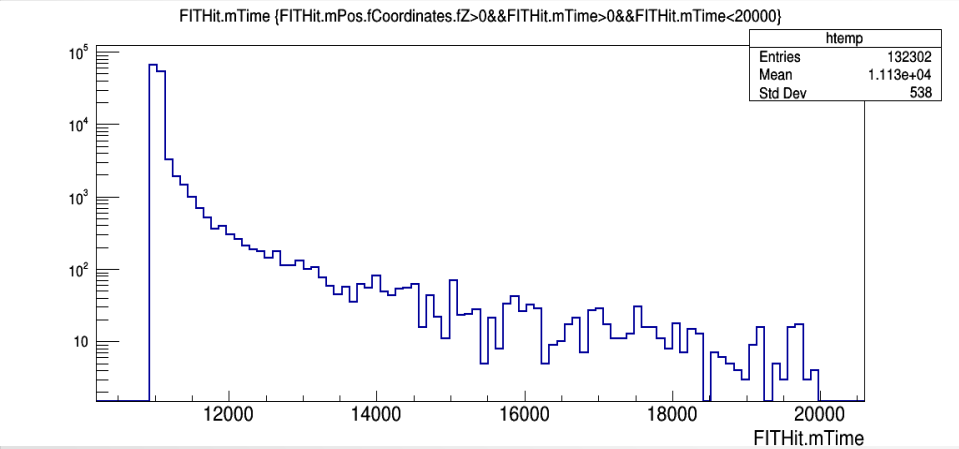
class o2::fit::Geometry
class o2::fit::Detector

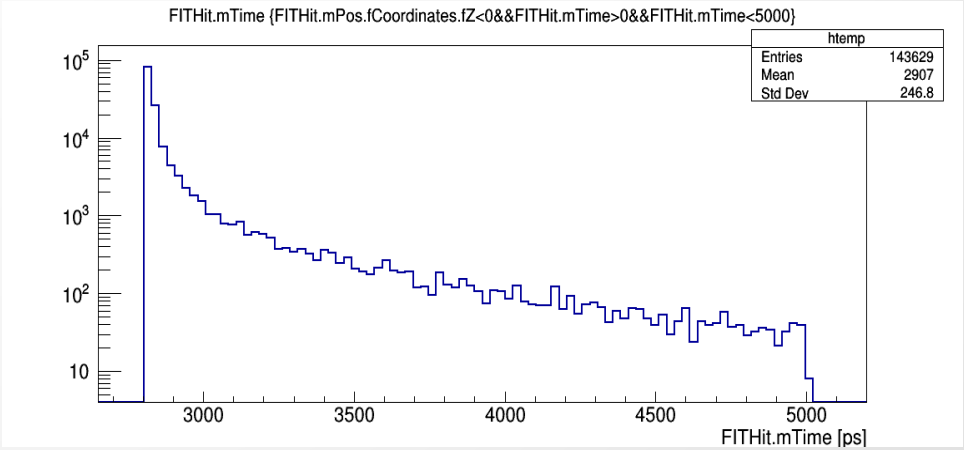
No special Hit class

XY and time distributions of charged particles from FIT hits









To be done next

- Production of Cherenkovs photons should be fixed;
- To repeat performance plots for T0+: trigger efficiency, centrality, event plane resolution ;
- Implement of V0+ ;

Timetable: simulation

D12.10			
D12.10.1	**General geometry and base classes** **T0+ geometry** **V0+ geometry**	**A.Maevskaya** **A.Maevskaya, M.Słupecki** **???????????**	Q4.2017
D12.10.2	**Hits creation**	**A.Maevskaya**	**Q4.2017**
D12.10.3	**Digitization**	**D.Finogeev**	**Q2.2018**
D12.10.4	**Trigger simulation**	**M.Słupecki**	**Q2.2018**

Timetable: reconstruction

D13.12.1	Common: raw data decoding at FLP, convert raw data to digits: time, amplitude, trigger signals	D Finogeev	Q4 2018
D13.12.2	Reconstruction on EPN T0+: interaction time, vertex and multiplicity reconstruction	A.Maevskaya	Q3 2018
D13.12.3	Calibration at FLP : dead and noisy channels	D.Finogeev	Q4.2018
D13.12.4	T0+: Calibration at EPN: individual channel offset, global offset, multiplicity	A.Maevskaya	Q4.2018