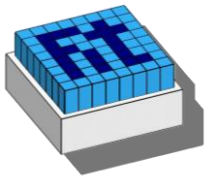# Status of FIT developments: T0+

Alla Maevskaya for FIT team

5 December 2018
ALICE offline week

Fast Interaction Trigger: requirements

Online
- Luminosity monitoring and feedback to LHC
- Trigger signals
  - Online Vertex determination
  - Minimum Bias and centrality selection
  - Rejection of beam-gas events
  - Veto for Ultra Peripheral Collisions
  - Minimal trigger latency <= 425 ns

Offline
- Collision time for Time-Of-Flight particle ID determination
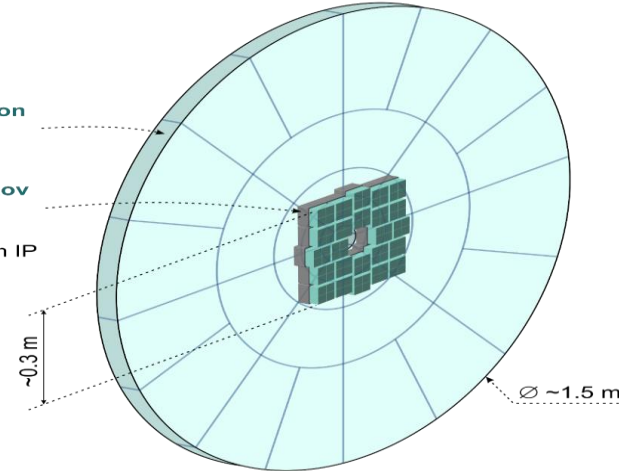- Multiplicity, centrality and event-plane measurements
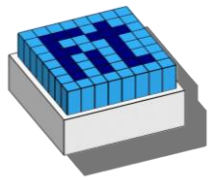
FIT detector
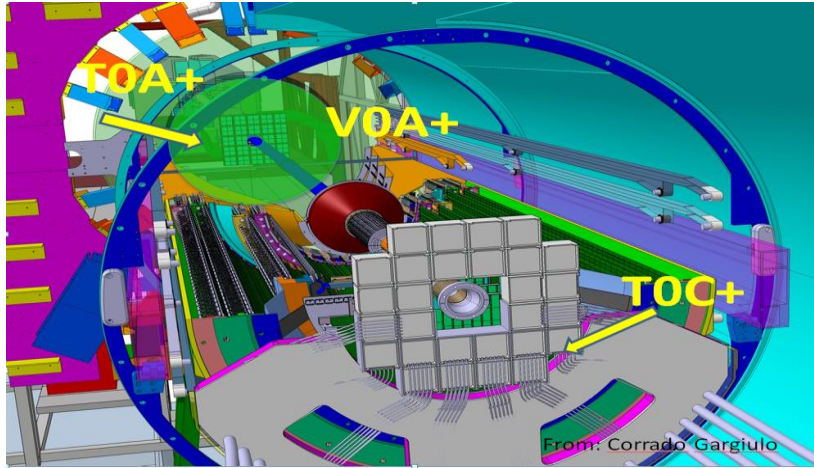
V0+ scintillation detector
2.2 ≤η≤ 5.0

T0+A Cherenkov detector
3.8 ≤η≤ 5.0
3.5 m away from IP

T0+C Cherenkov detector

-3.4 ≤η≤ -2.3
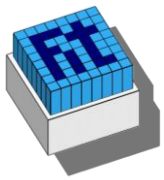-0.8 m away from IP

~0.4 m

~0.3 m

∅ ~1.5 m

From: Corrado Gargiulo

The **MCP-PMT XP85012** with 64 anode pads is transformed into the 4-channels detector by merging 16 pads (4 × 4) of each cell into a single channel
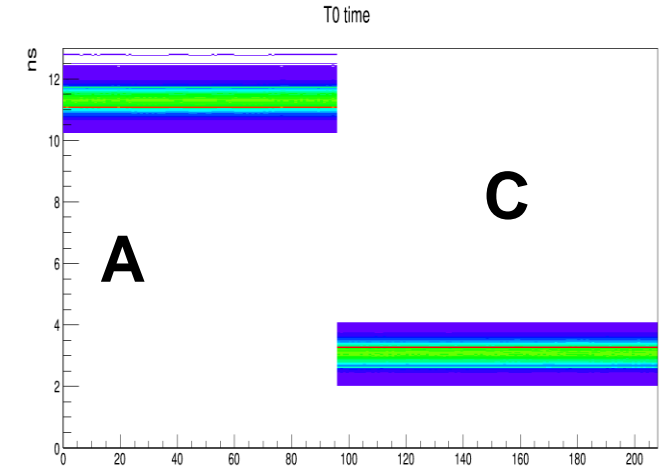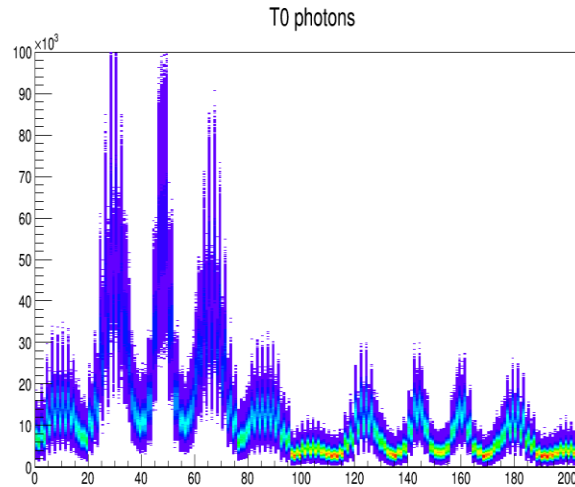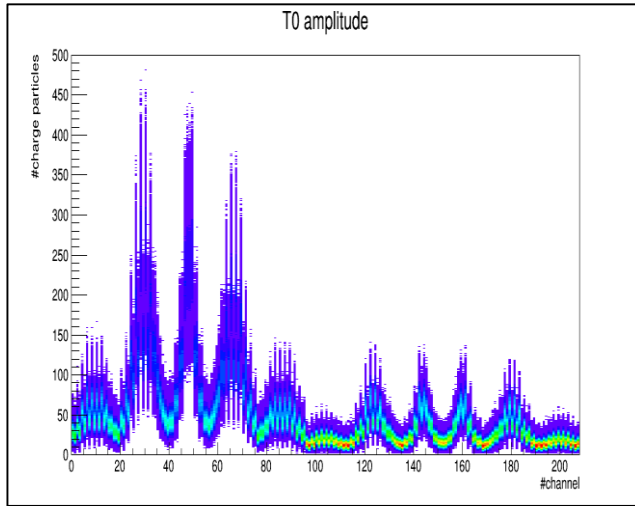
Each V0+ sector is based on
- 4cm of EJ-204 plastic scintillator
- clear Asahi fibers with recessed ends
- 2" Hamamatsu R5924-70 fine-mesh PMTs.

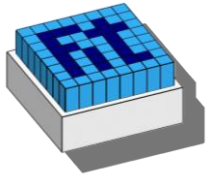# T0+ hits

Time of flight of each photoelectron
Charge particle hits for "MC true" multiplicity

Pb-Pb centrality 0-10%, LHC18d4a

T0+ Digits

**For each quadrant (channel) for all sources together :**
➢Average time over all photoelectrons within narrow time range +-2ns;
➢Number of MIPs (measured and simulated by AliRoot Nphotons/MIP = 260)

After loop over event parts:
✓ Smear CFD time by 50 ps
✓ Set trigger signals: vertex in given Z range, OrA, OrC, Central, Semicentral
✓ BC, orbit, event time provided by DLP framework

Detector will be calibrate to have signal from interaction with Z=0 in the middle of bunch 12.5 ns.

MClabels: store number of charge particles per quadrant within given time range, sum of all event parts
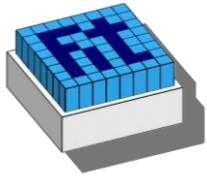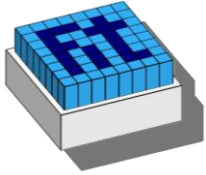
T0+ RecPoints

Read from Digits:
➢ time and amplitude for each channel;
➢ BC and orbit are convert to timestamp by InteractionRecord (not tested yet)

Calculate:
✓ collision time as average time for each side – T0A & T0C and (T0A+T0C)/2
✓ Vertex position (T0A-T0C)/2
✓ Sum multiplicity for each side

?Interaction time around center of bunch + timestamp from DPL ?

To be done

Most urgent:
1. Wrap reconstruction with DPL framework   Q4 2018
2. Include V0+ to the FIT directory similar to ITSMFT   Q1 2019

Next steps:
Calibration
QA