

# **O<sup>2</sup> FIT T0+ status**

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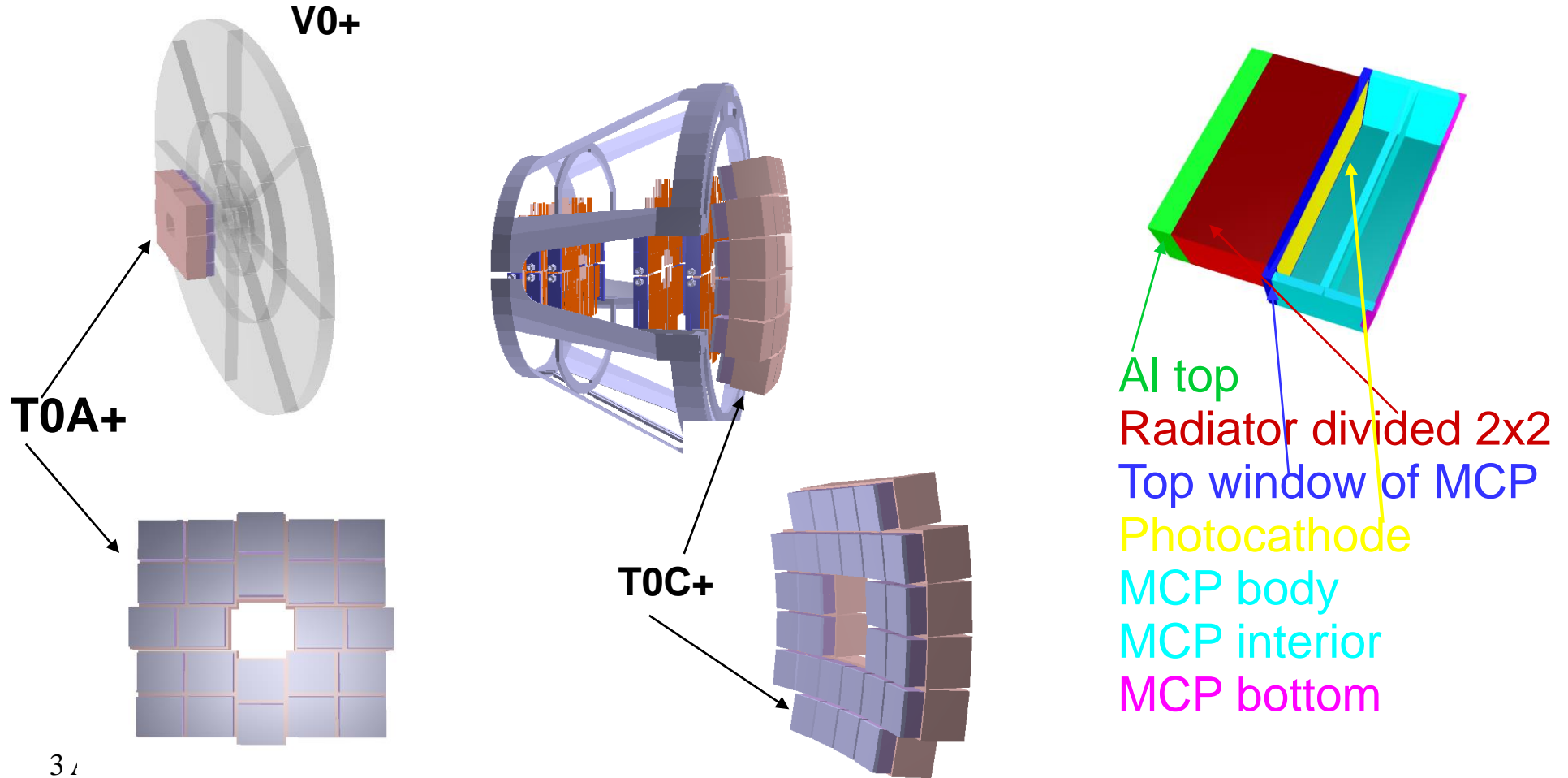
# Outline

- FIT geometry T0+ & V0+
- T0+ hits creation
- Digitization integrated in DPL
- Reconstruction
- Milestones

**1<sup>st</sup> implementation of V0+ - thanks to Maciej**

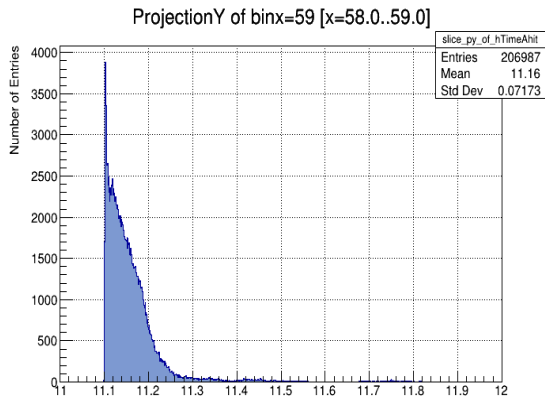
**Details in Jacek presentation**

# FIT : geometry

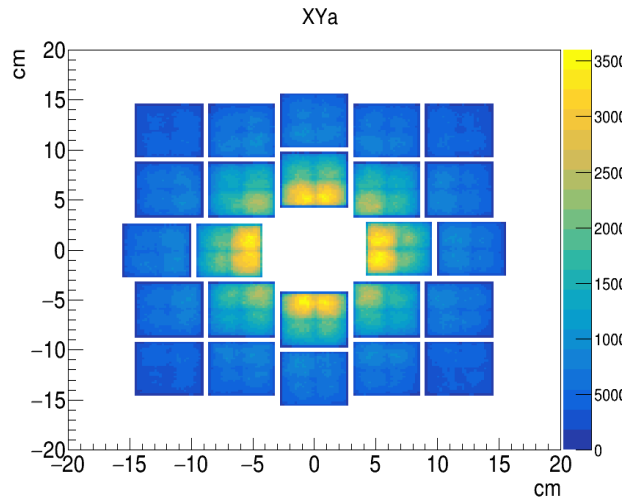


# T0+ Hits

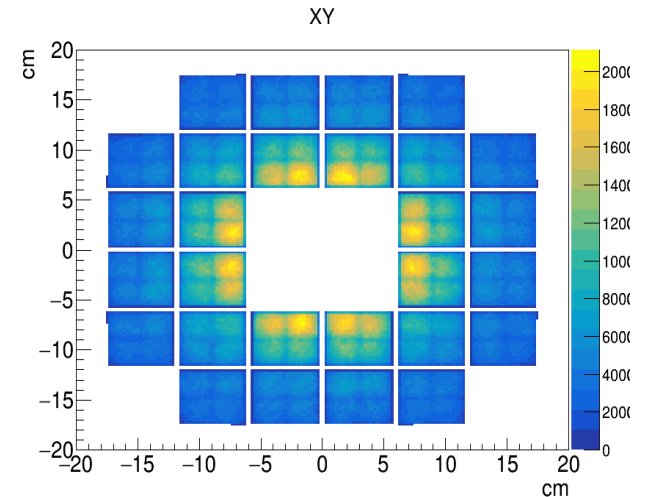
fit::HitType Inherit from BasicXYZEHit<float>::BasicXYZEHit, nothing in addition  
Collect photoelectrons at photocathode for each quadrant ( channel)



P.e. time distribution for one channel

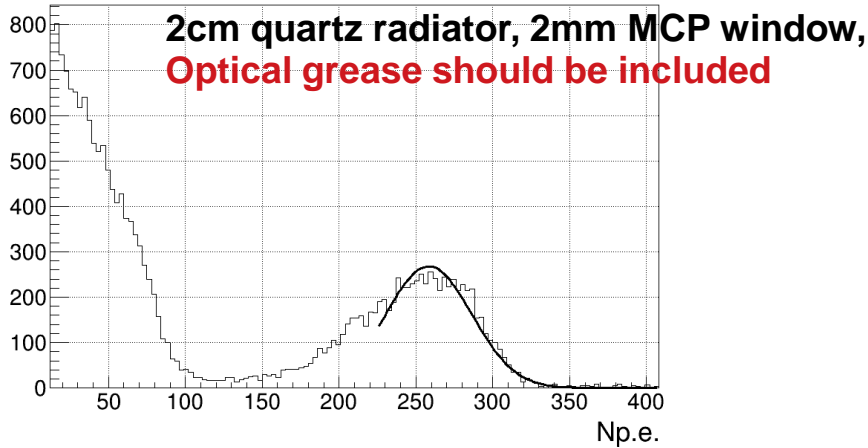


XY distribution of photoelectrons for T0A+ and T0C+ for 10000 Pythia8 events



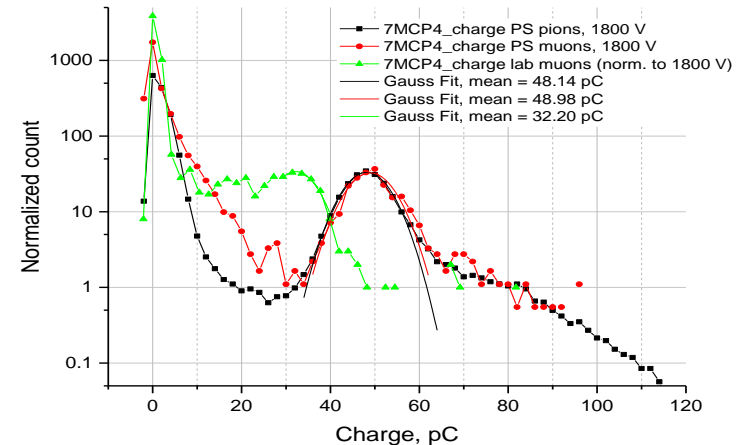
# Comparison with PS test

Number of photoelectrons in 1



6 GeV/c pions in pseudorapidity (-2, -4)

Default Cherenkov module configuration:  
2 cm-thick quartz radiators +  
Dow Corning 200 grease +  
2 mm MCP-PMT window.



- $N_{p.e.}$  is found to be  $48.14 \text{ pC} / 0.17 \text{ pC} \approx 290$  basing on the mean signal charge measurements ;
- 6 GeV/c negative pions and muons;

# Digitization

o2::fit::common **FITDigitizerSpec, FitDigitizerWriter, Digitizer**  
**o2::t0::DigitizationParameters** specific for T0 and V0.  
Can be changed with V0 code implementation.

T0+ can register data for every bunch and generate trigger signals  
**Vertex; OrA, OrC, semi-central (SC), central©**

For each channel (radiator quadrant):

- ◆ Average time of flight of photoelectrons within given time gate – 5ns
- ◆ Amplitude as number of photoelectrons within given time gate.

Electronics will be tune such way to have signals from Zvertex=0 in the middle of the bunch

Do be done:

- ◆ real detector response based on PS test data
- ◆ Conversion to raw format – format is define

# MC labels

number of charge particle for each source for each channel for each event

**Important for investigation of QED background**

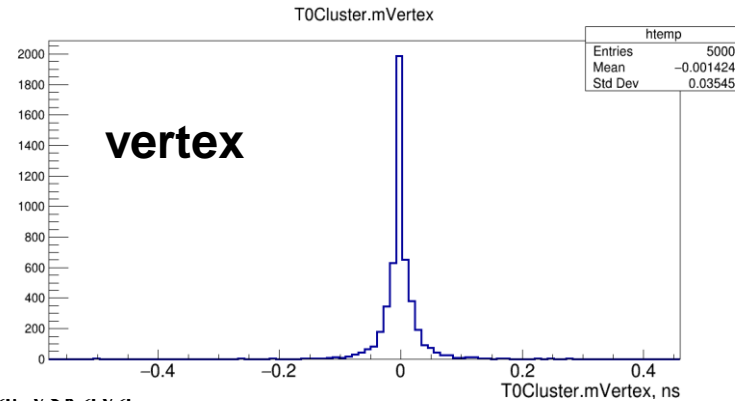
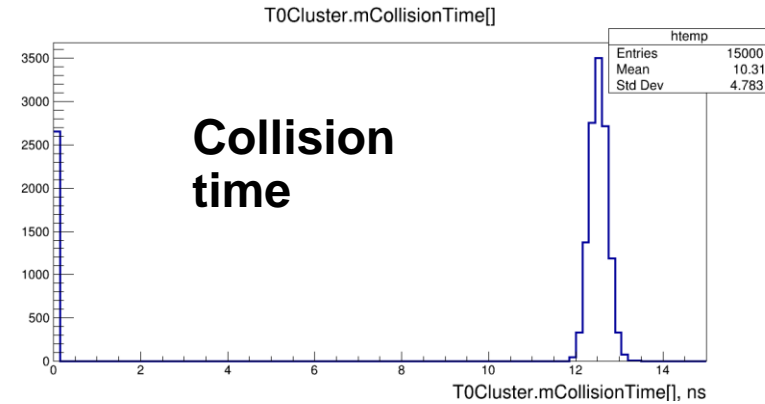
# Reconstruction

## T0Cluster

- Orbit
- BC
- Timestamp
- Vertex
- Collision times T0A, T0C, T0A&C

For each channel:

- Time
- Amplitude





# To be done

- **Change detector name to 3 letters name : T0 -> T0+**
- MC labels
- Implementation of real detector response based on PS test data.
- Conversion digits to raw data
- Read and reconstruct raw data
- Calibration @ FLP – individual channels
- Calibration @EPN – global offsets

# Summary

<b>Change detector name to 3 letters name : T0 -&gt; T0+</b>	April 2019
<b>MC labels</b>	April 2019
<b>Real detector response based on PS test data.</b>	End of May 2019
<b>Code / decode raw data</b>	Q3 2019
<b>QC</b>	In Jacek talk
<b>Calibration</b>	Q4 2019