ORCA4 Data Analysis in TSU

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KM3NeT/ORCA4 Data and MC in TSU

- ORCA4 Data: 23/07/2019 - 26/01/2020

  Last ORCA4 run: KM3NeT_00000044_00007219.root

ORCA4 Data and MC in HEPI TSU

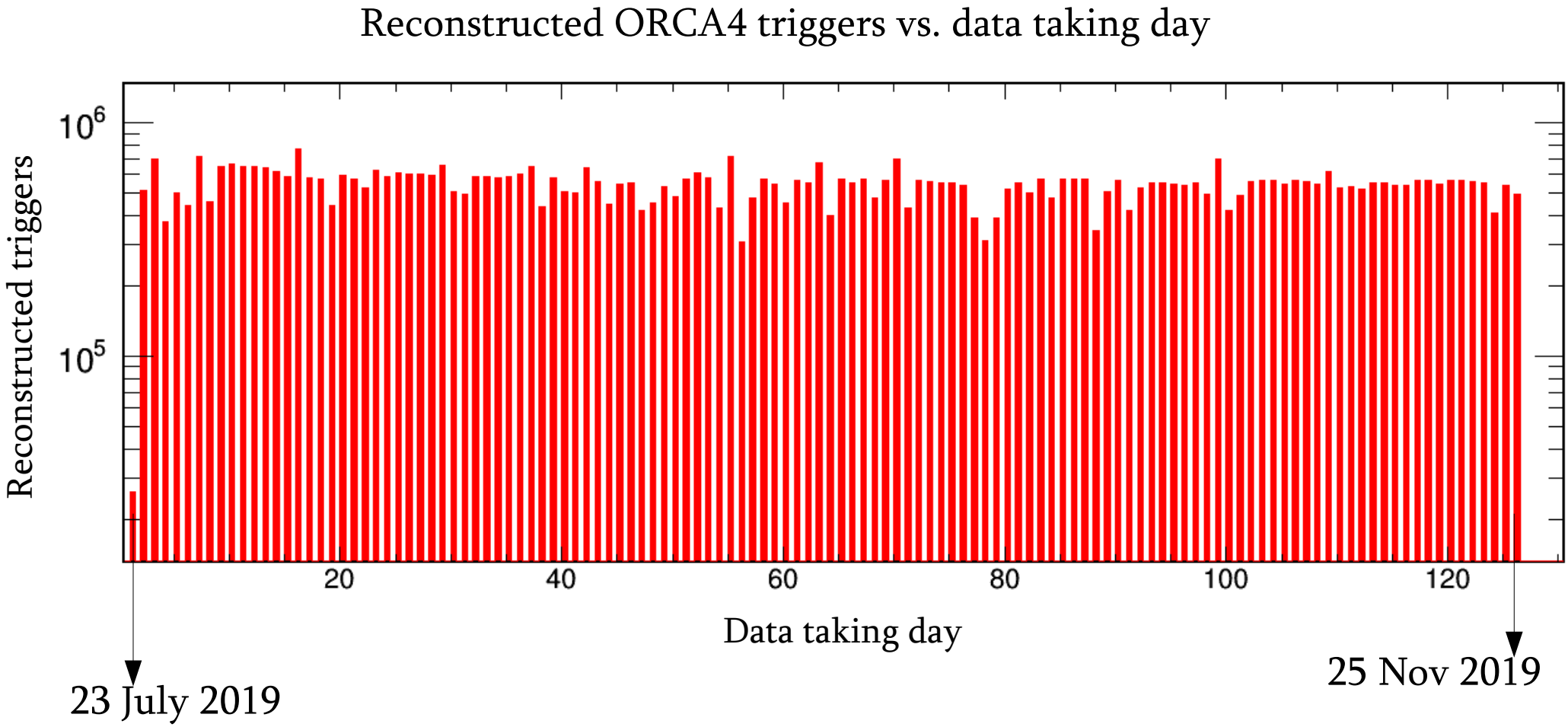
ORCA4 data		23/07 – 25/11/2019		566 files (533 analysed) (about 7 10^7 events)
atm-μ (mupage)			Sirene	1502 files (375 @TSU)
			km3	4394 files
atm-ν (genhen)	10-10^8 GeV -1<cosz < 1 sim: 10^5 ev. / File	ν_μ-CC	Sirene	487810 (about 5x10^7)
			km3	481320
		anti ν_μ-CC	Sirene	531424 (about 5x10^7)
			km3	524506

- Detector files:

  Lyon-cc: /sps/km3net/repo/data/calibration/KM3NeT_00000044/
  (511 detector configuration files)

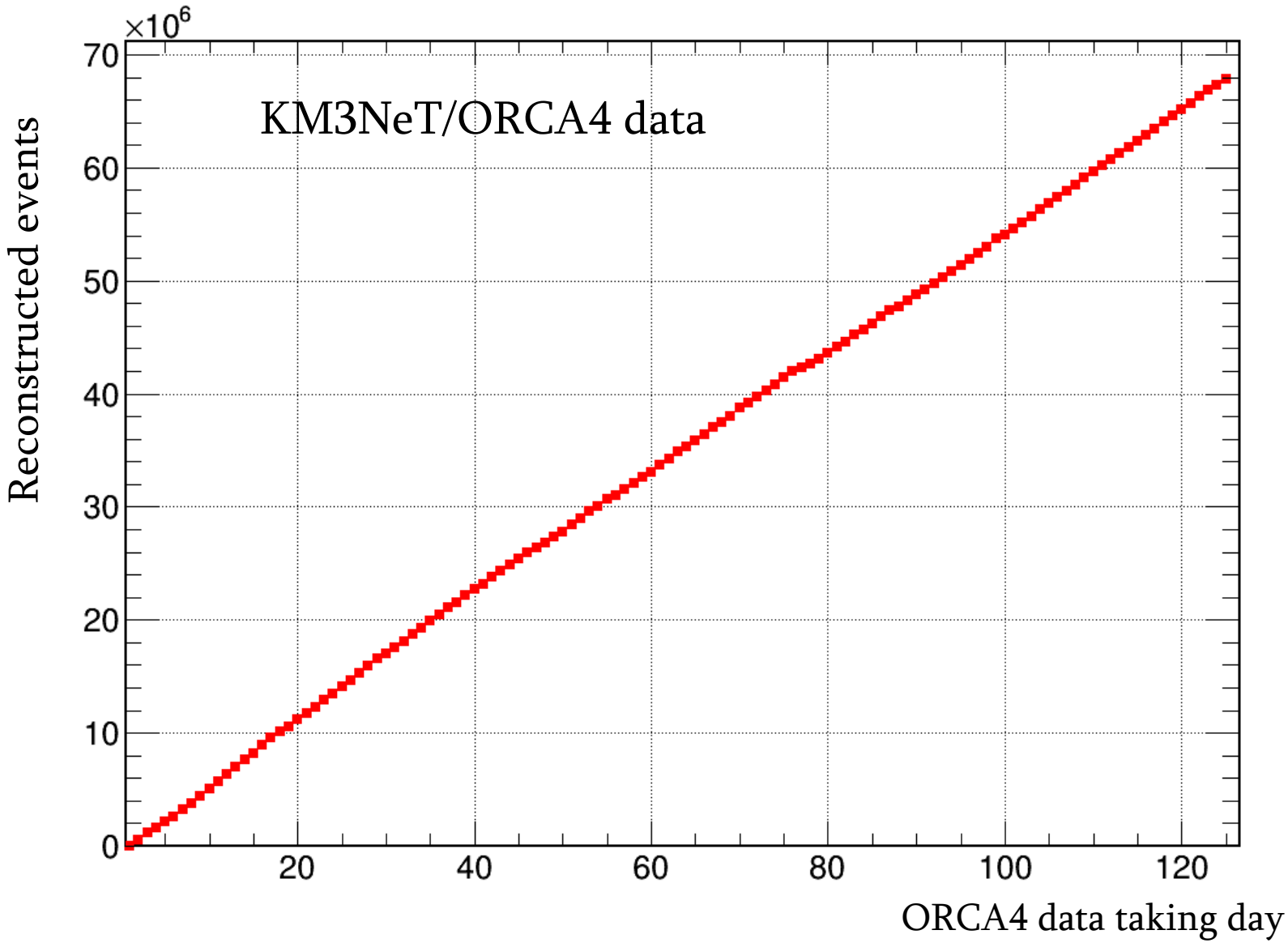
KM3NeT/ORCA4 Data

- Processed Data: 23 July 2019 – 25 Nov 2019 (126 days)
- 68 285 262 (about $7 \cdot 10^7$) reconstructed triggers / 533 files



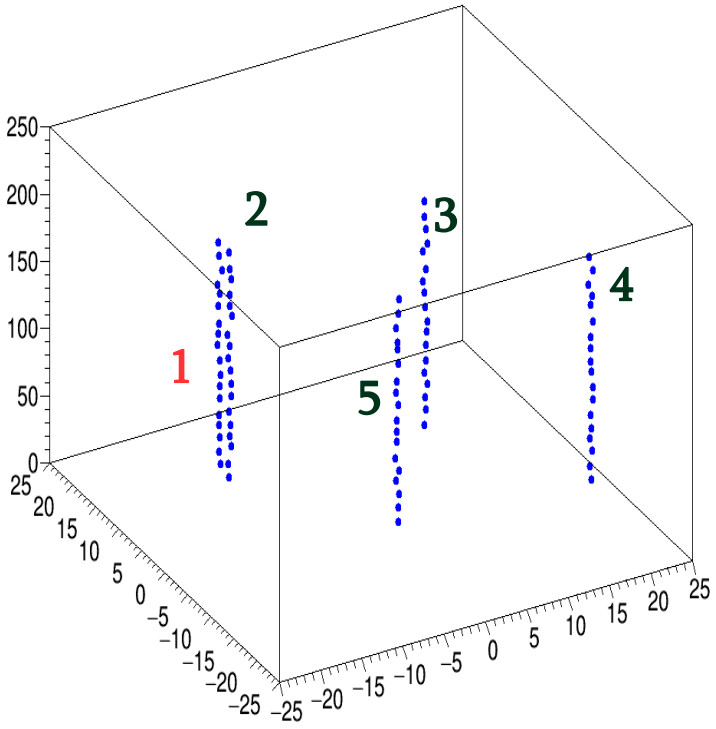
KM3NeT/ORCA4 Data

- ORCA4 data: 23 July 2019 – 25 Nov 2019 (126 days)



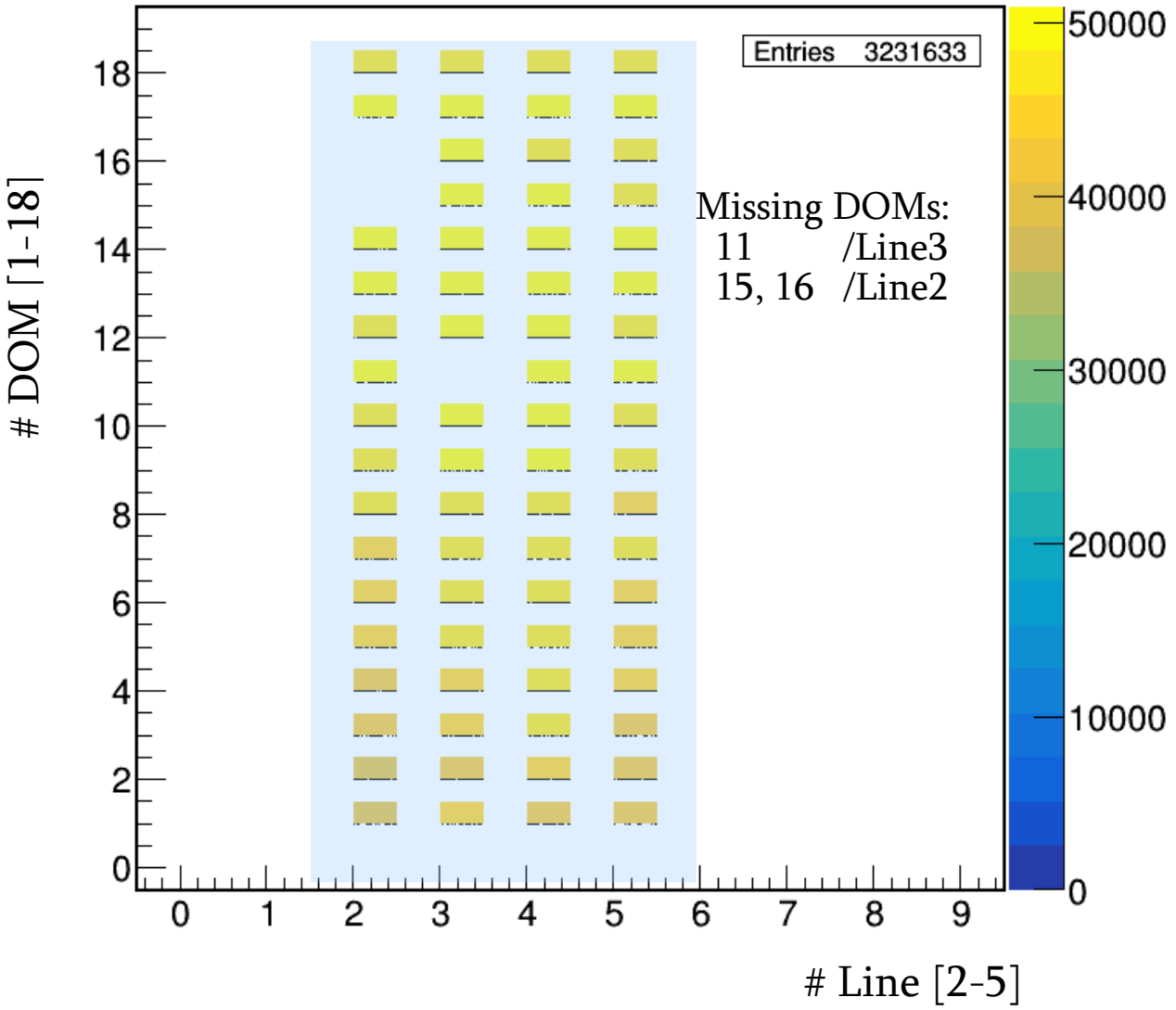
KM3NeT/ORCA4 Configuration(s)

ORCA4 Configuration

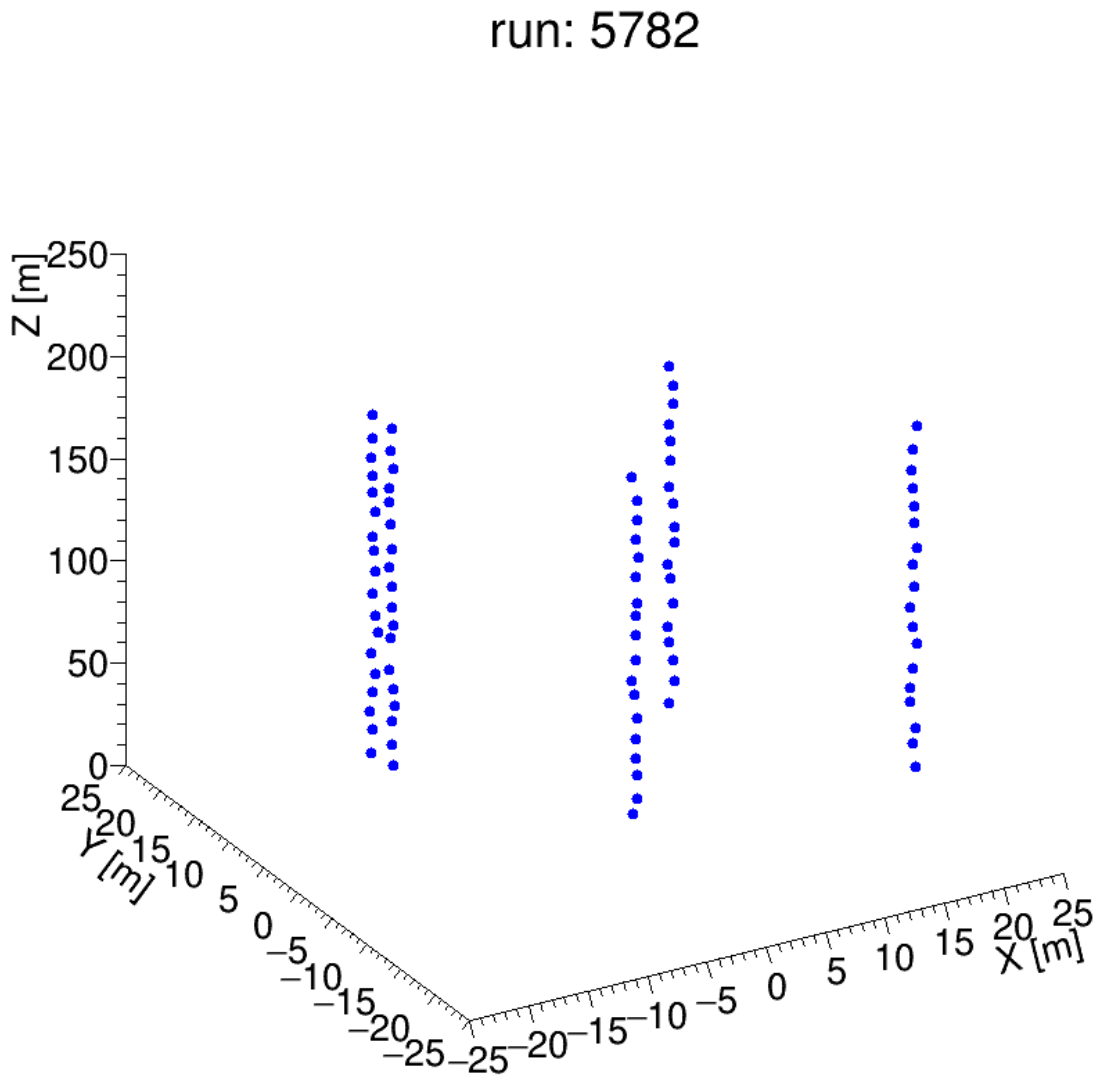


Lyon-cc /sps/km3net/repo →
511 detector configurations
(>50 runs without detx-files)

ORCA4 Detector hits



KM3NeT/ORCA4 Configurations (Animation)

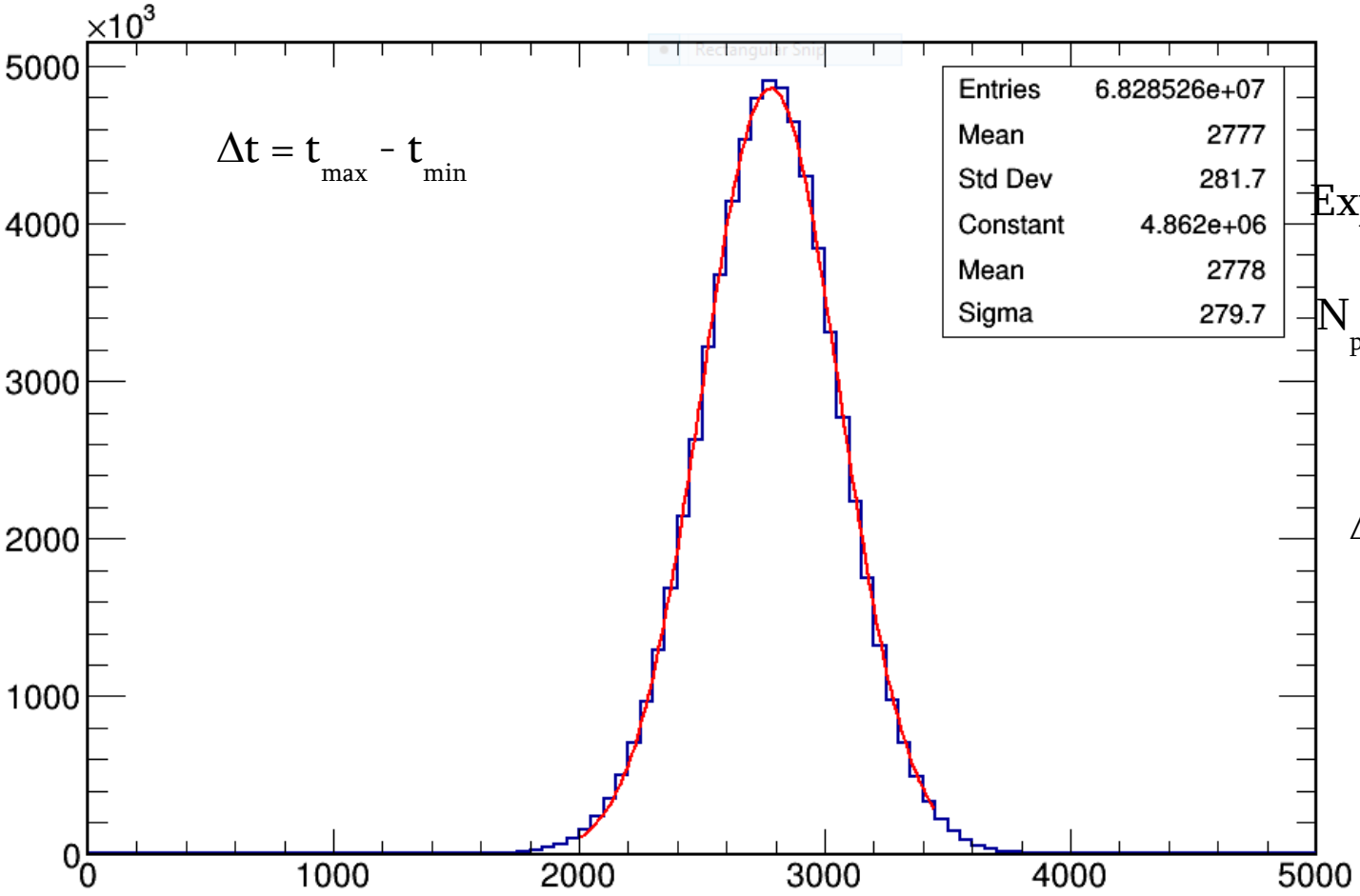


KM3NeT/ORCA4 Data (Event time)

All processed data: 6.8×10^7 triggers

t_{min} - time of the first hit in the event

t_{max} - time of the last hit in the event



Expected hits: $N = N_{pmt} R \Delta t$

$N_{pmt} = 69 \times 31 = 2139$ PMT

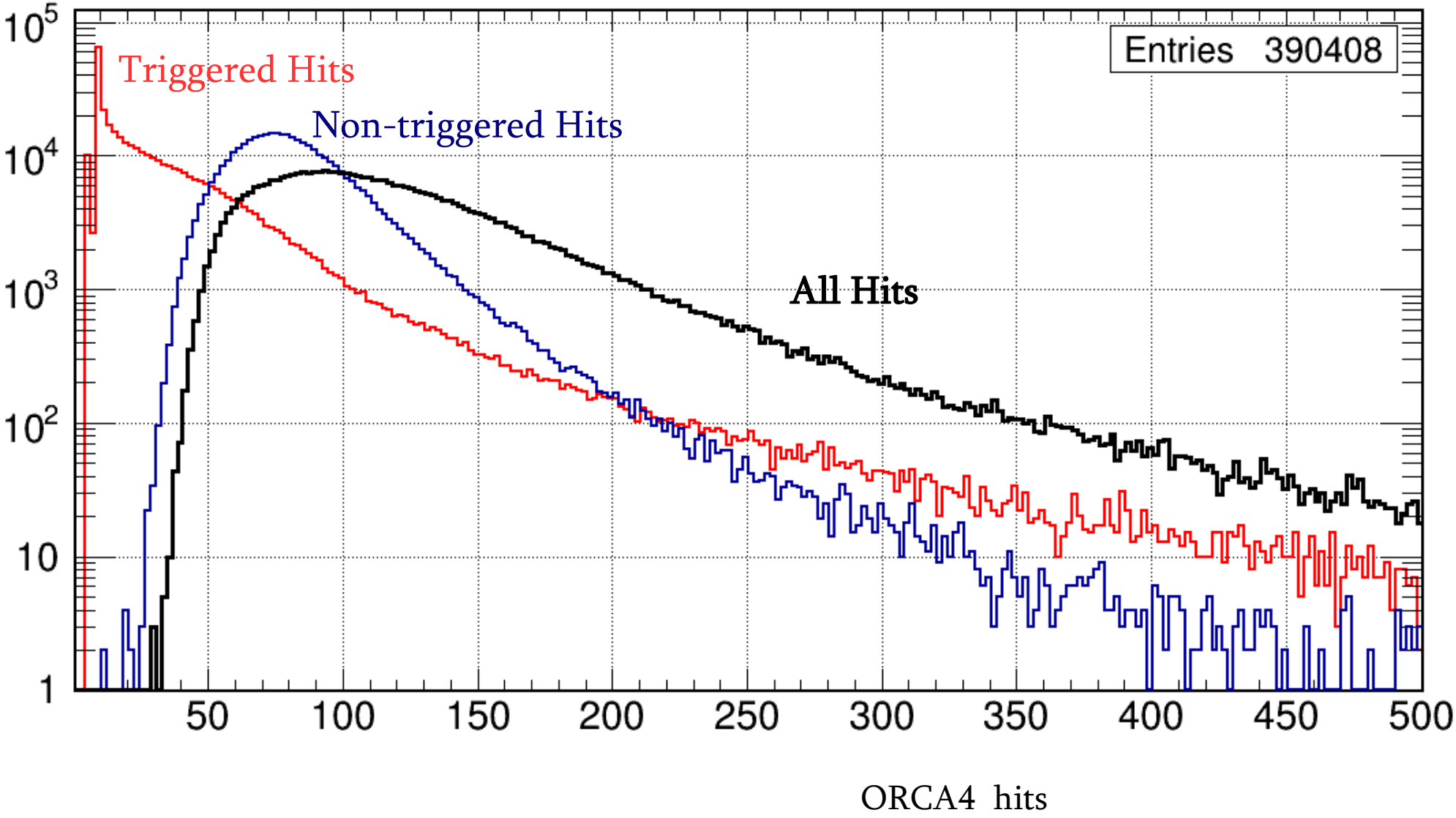
$R = 10$ kHz

$\Delta t = 2.8$ μsec

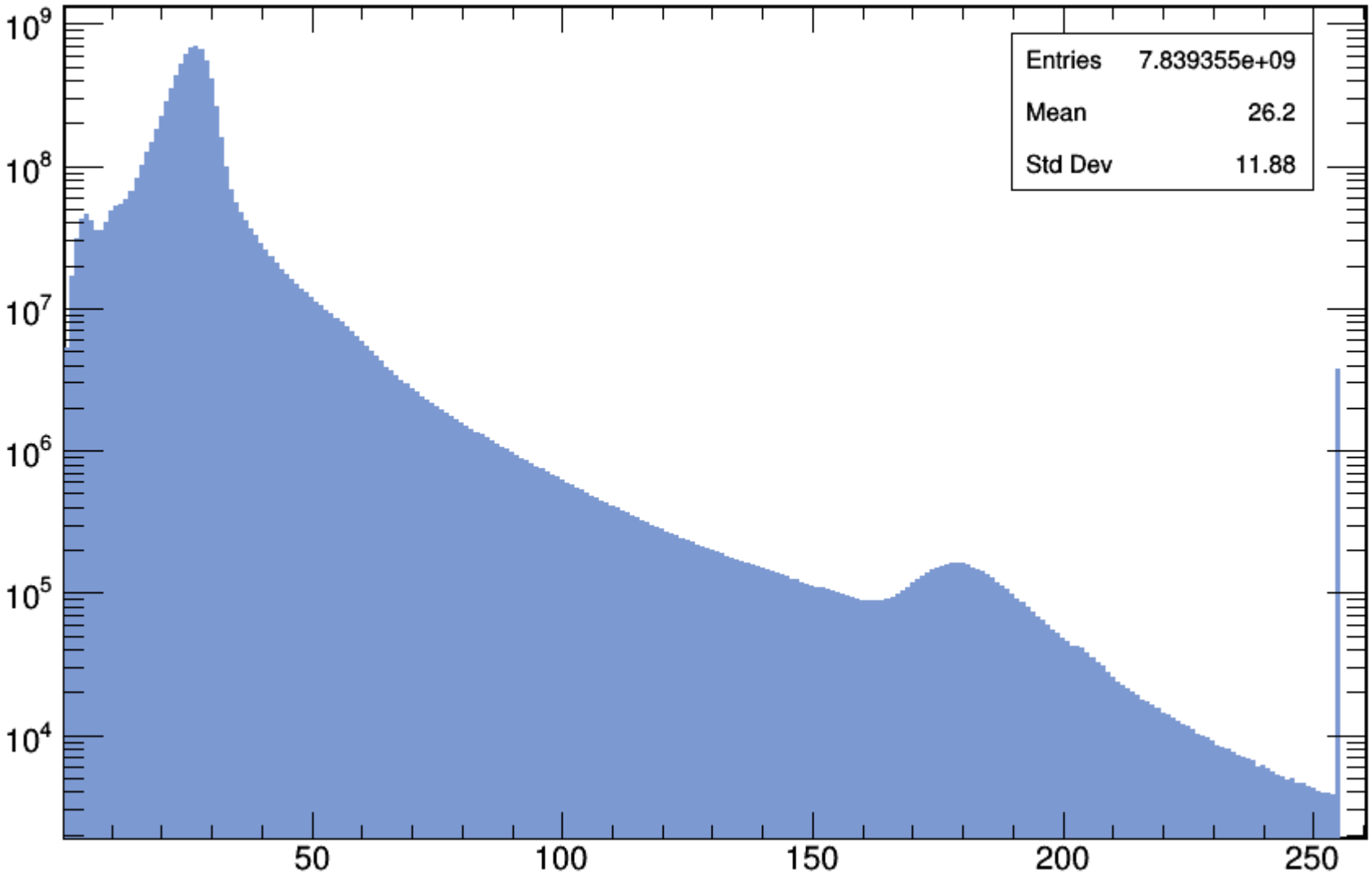
$N_{pmt} \approx 60$ hits (bkg hits)

KM3NeT/ORCA4 Hits

Data: 5 runs



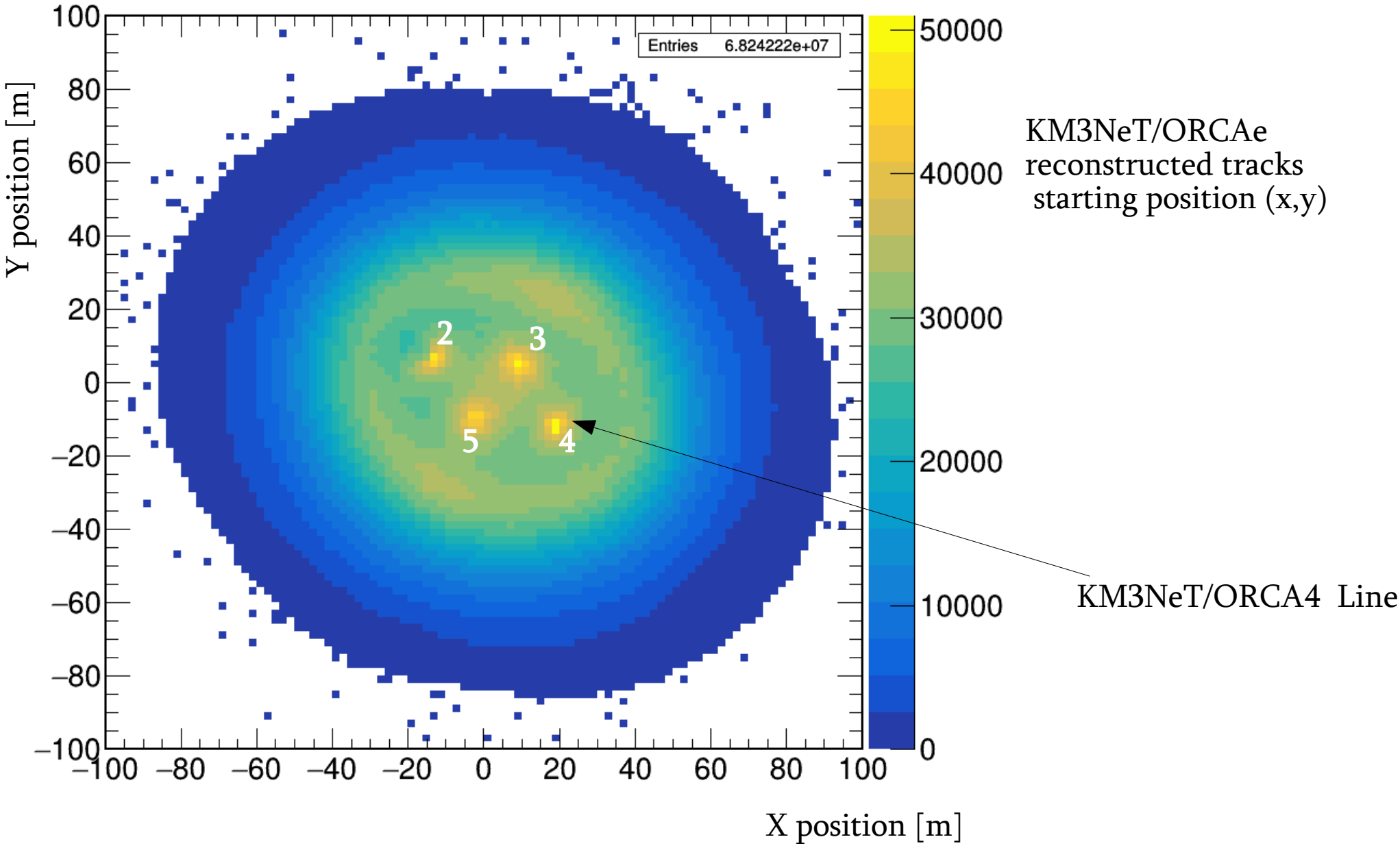
KM3NeT/ORCA4 Data PMT Signals



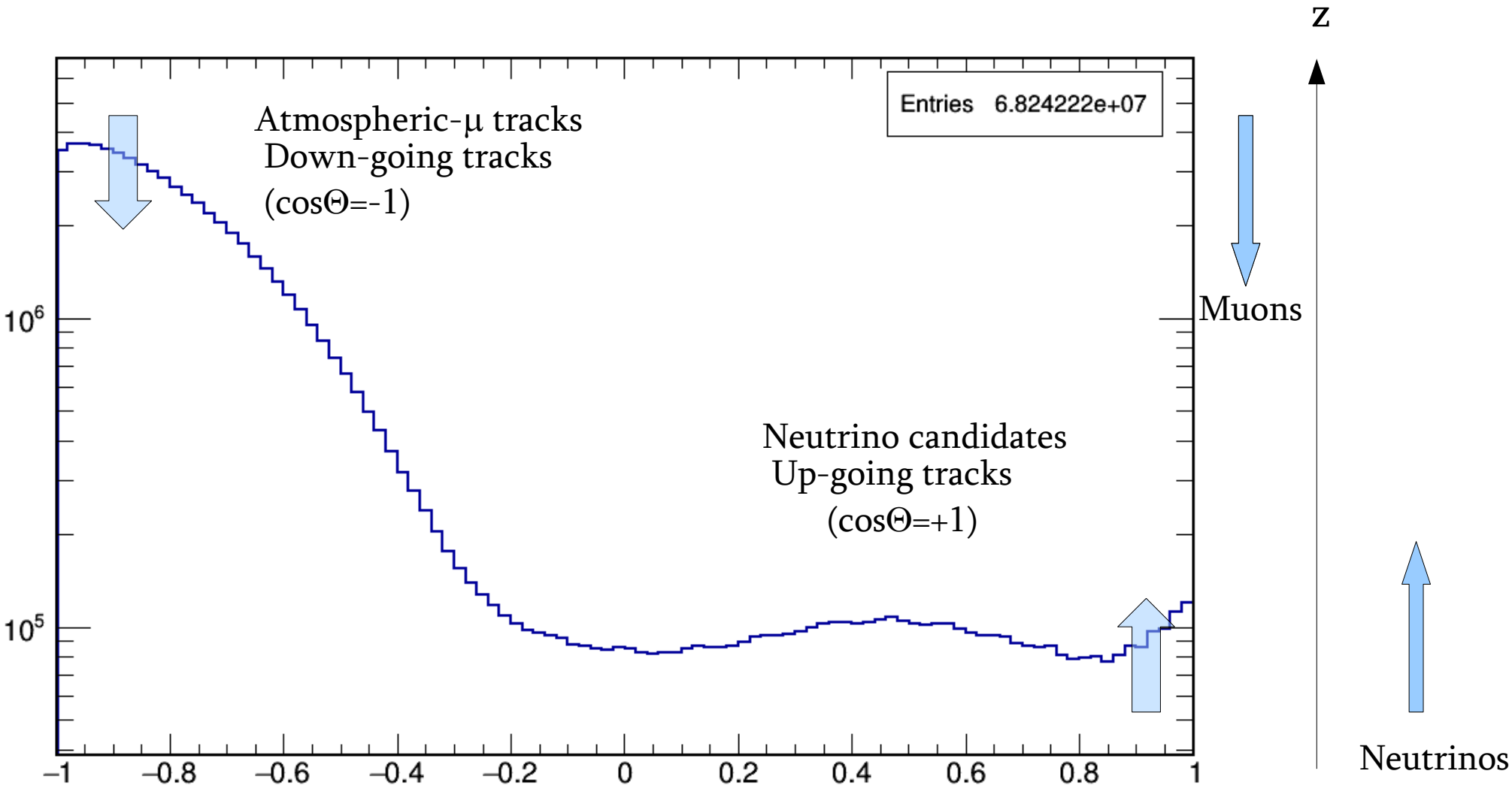
ORCA4 PMT signals

KM3NeT/ORCA4 Reconstructed Tracks (x,y)

ORCA4 data: 23/07-25/11/2019 (about 7 10^7 triggers/tracks)



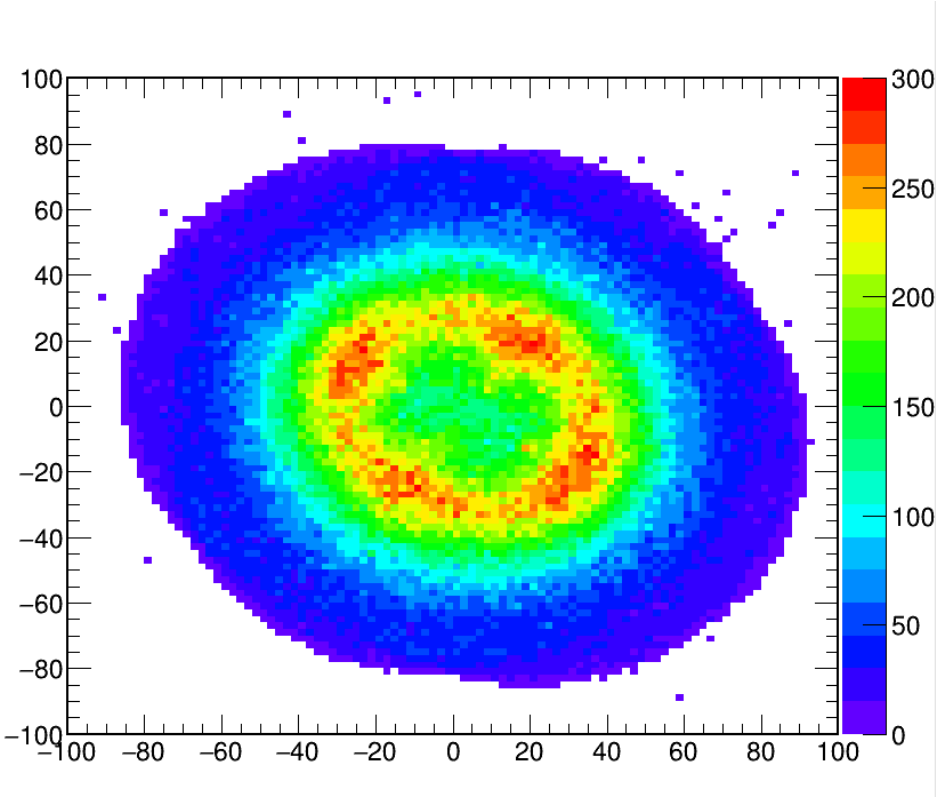
KM3NeT/ORCA4 data



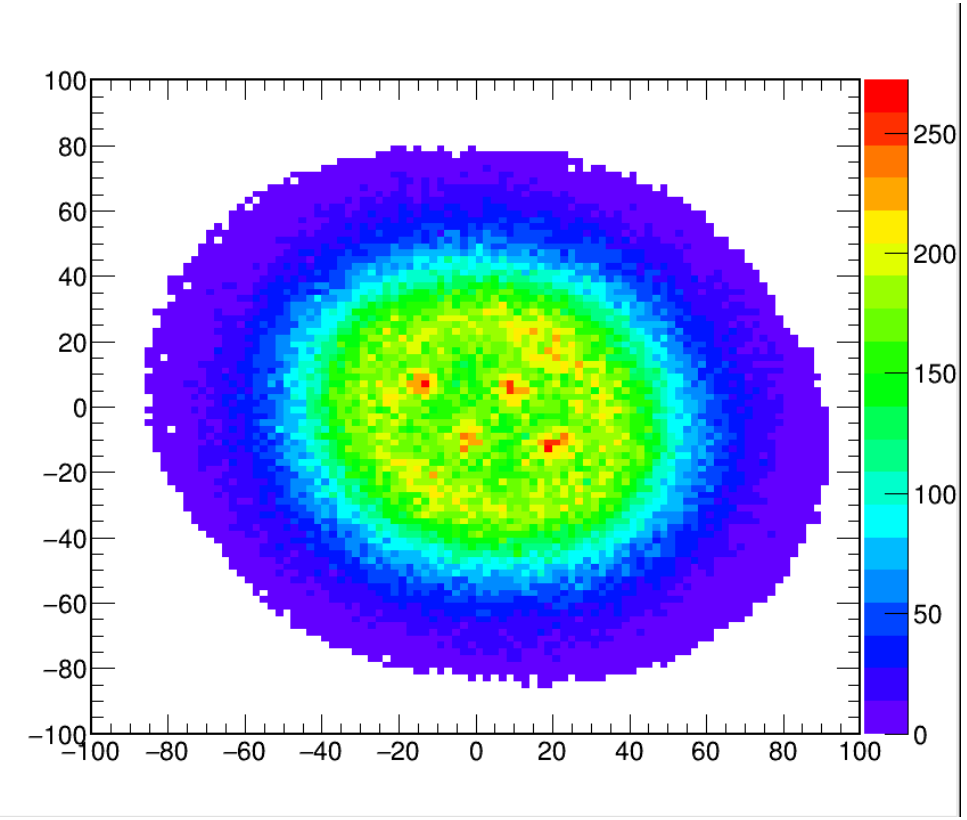
KM3NeT/ORCA4: reconstructed tracks z-direction

KM3NeT/ORCA4 MC

- Reconstructed MC data (atmospheric neutrinos and muons)



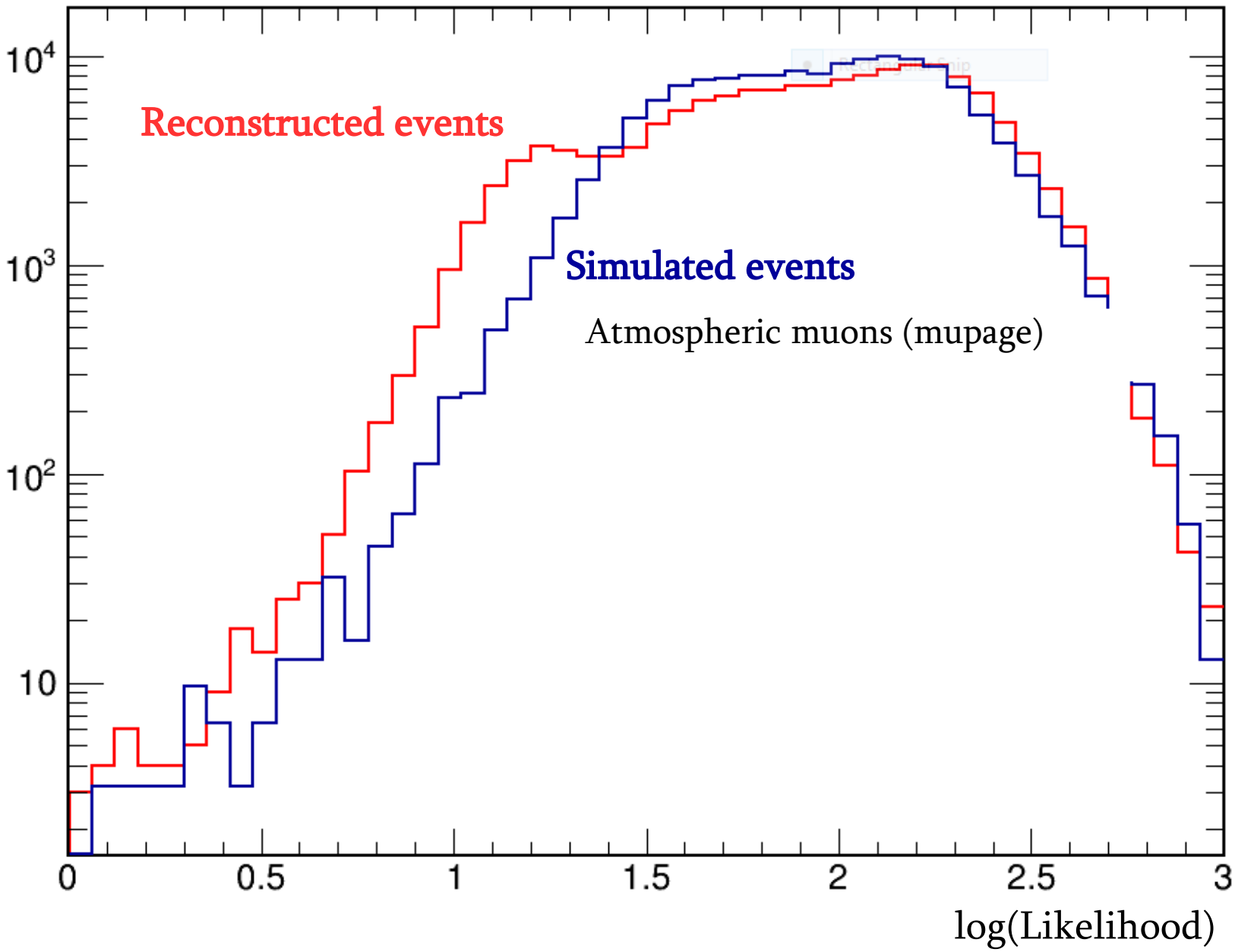
Neutrino MC (ν_μ-CC / km3)



Atm-muon MC (mupage/ km3)

Plots with ROOT v5.34/23
(Color palette is different from v6)

KM3NeT/ORCA4 Data/MC: Reconstruction Quality



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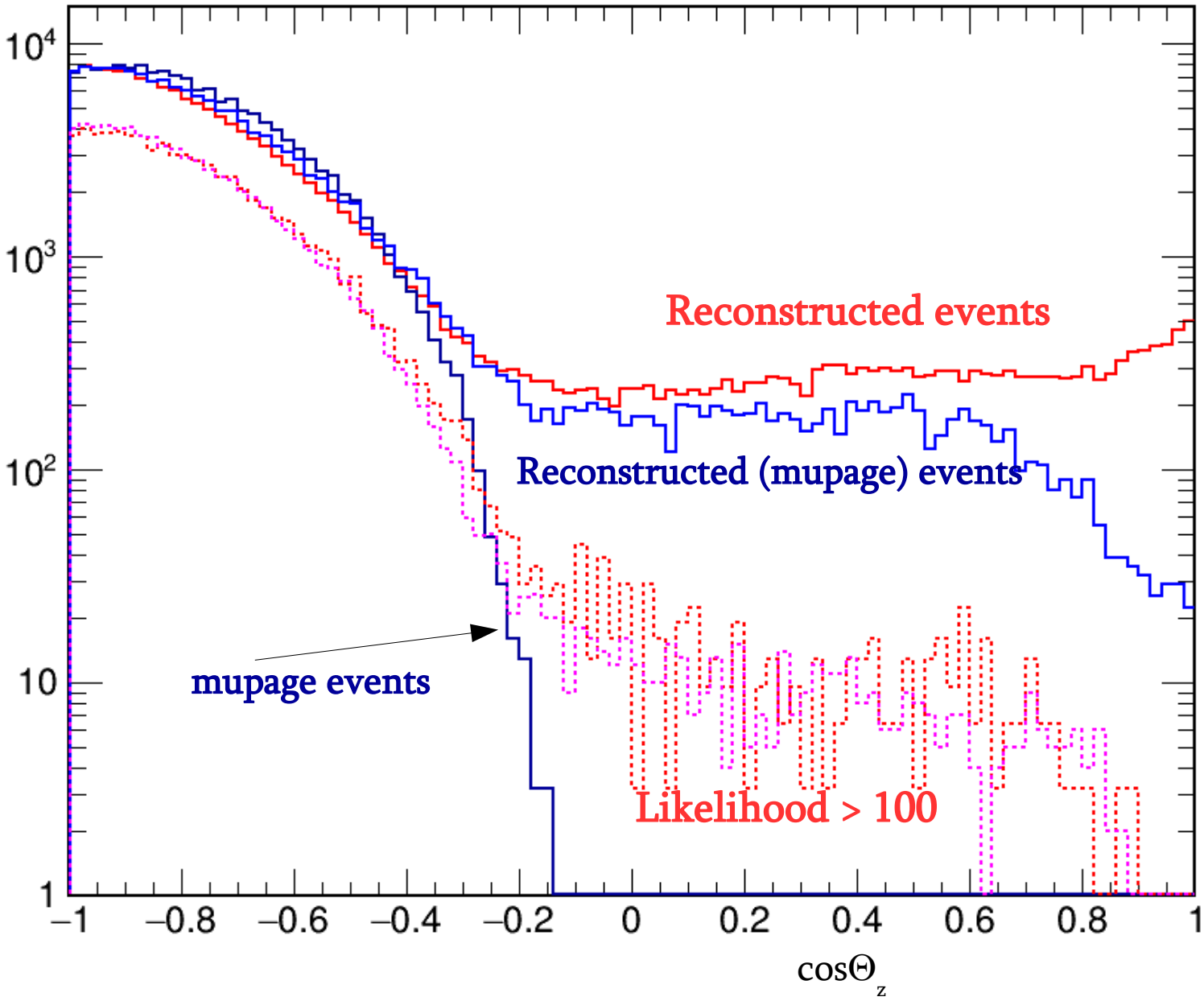

Comparison of data and atm-μ events

Example for run: 5886

Summary and Outlook

ORCA4 data analysis @HEPI TSU:

- "Low-level" ORCA4 data analysis was performed:

- Processed ORCA4 data for 126 days (aanet -data format) is copied to TSU

- 533 runs (from 566) are analyzed with a help of KM3NeT@TSU Tier-2 server

  (About $7 \cdot 10^7$ reconstructed triggers)

- ORCA4 MC → analysed in a same way (in progress)

Oulook

- Data/MC comparison and "high level" analysis of muon and neutrino events