



TAO Data Quality Monitoring

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Motivation

The TAO Experiment:

- TAO is JUNO's satellite experiment with a Central Detector (CD) of **8048 SiPM channels**

Motivation:

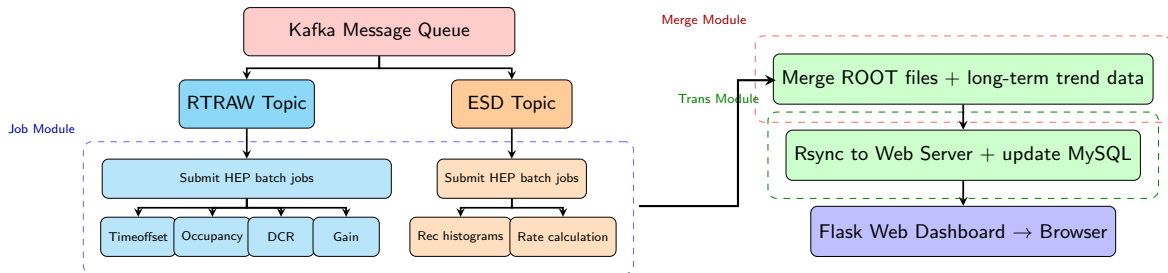
- TAO requires real-time monitoring of detector performance
- To ensure taking high quality data and improve data taking efficiency

Run ID	Run Type	Start Time	Stop Time	Duration (s)	Comment
1785	Physics	2026-07-04 11:55:21	2026-07-04 11:55:21	0	—
1784	Physics	2026-07-03 11:53:49	2026-07-04 11:53:49	1 day, 0:00:00	—
1783	TEST	2026-07-03 11:41:15	2026-07-03 11:42:39	0:01:24	WT-LG-pedestal, during CLS go home
1782	TEST	2026-07-03 11:38:36	2026-07-03 11:39:59	0:01:23	WT-HG-pedestal, during CLS go home
1781	Cali-Pos	2026-07-03 09:07:06	2026-07-03 11:35:40	2:28:34	CLS calibration when Cs137 source moving, ACU cabinet power on DAQ auto-restart ...
1780	Cali-Pos	2026-07-03 08:46:25	2026-07-03 09:05:48	0:19:23	restart the CLS calibration CLS calibration when Cs137 source moving, ACU cabine...
1779	Cali-Pos	2026-07-03 08:39:31	2026-07-03 08:42:45	0:03:14	CLS calibration when Cs137 source moving, ACU cabinet power on DAQ auto-restart ...
1778	Cali-Pos	2026-07-03 08:25:21	2026-07-03 08:38:23	0:13:02	CLS calibration when Cs137 source moving, ACU cabinet power on CD GUI fatal error...
1777	Physics	2026-07-03 08:00:00	2026-07-03 08:10:45	0:11:01	Background run for CLS calibration, ACU cabinet power on, CD threshold lowered

Homepage

- ⇒ Need a fully automated pipeline: raw data → DQM plots → web dashboard
- ⇒ **jobserver** offers **automated pipeline** + **webserver** offers **web visualization** platform

Working Flow



RTRAW Pipeline

- Receive Kafka message
- Compute Timeoffset, Occupancy, DCR and Gain
- Generate long-term information: Occupancy/DCR/Gain bad channels

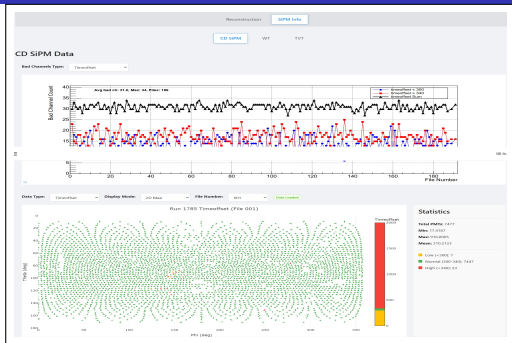
ESD Pipeline

- Receive Kafka message
- Produce Vertex (x,y,z,r), Energy, PE sum histograms and Muon/Singles/Trigger rate
- Generate long-term information: Muon/Singles/Trigger rate

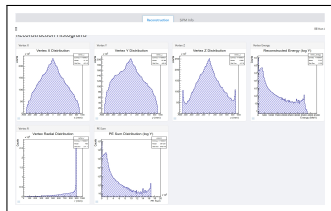
Summary & Outlook

What Has Been Built

- **Kafka-triggered** fully automated pipeline from EOS data to DQM results
- **Flask web dashboard**: specific run information, stability trends, channel quality grading
- **Interactive chart** based on WebGL and JSROOT
- **Deployed** at <http://taodqm.ihep.ac.cn:5002/>
- **Applied** in TAO shifter system



SiPM Info



REC Info



Bad channels



Muon/Singles rate