# DAQ System for a Beam Detection System based on TPC-THGEM

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# Background

Beam system: study the effect of location, energy and direction factors of electron beam on the detector.

Beam system = a electron beam equipment + 4 detectors

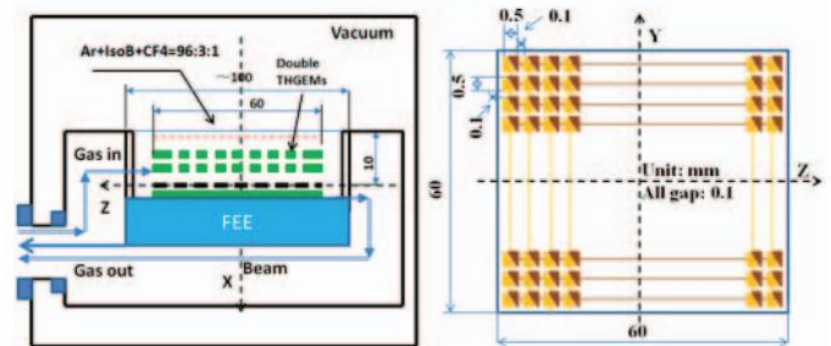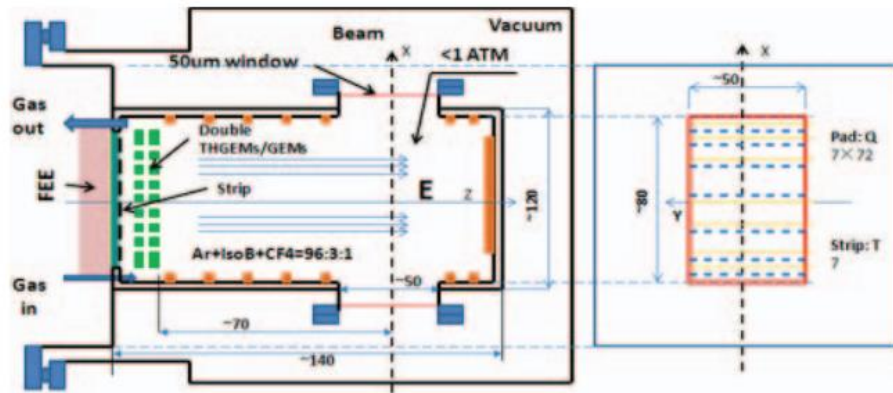TPC detector: measure tracks of electron online.



Fig. 1. Structures and principles of TPC and PDD

# Requirements

Run mode: 5 different modes

Readout System: 511 channels of TPC+ 211 channels of PDD, 100 Hz Rate

Control GUI Requirements: several measurements & graphs

Other Requirements: reconstruct data to events & able to configured by users conveniently
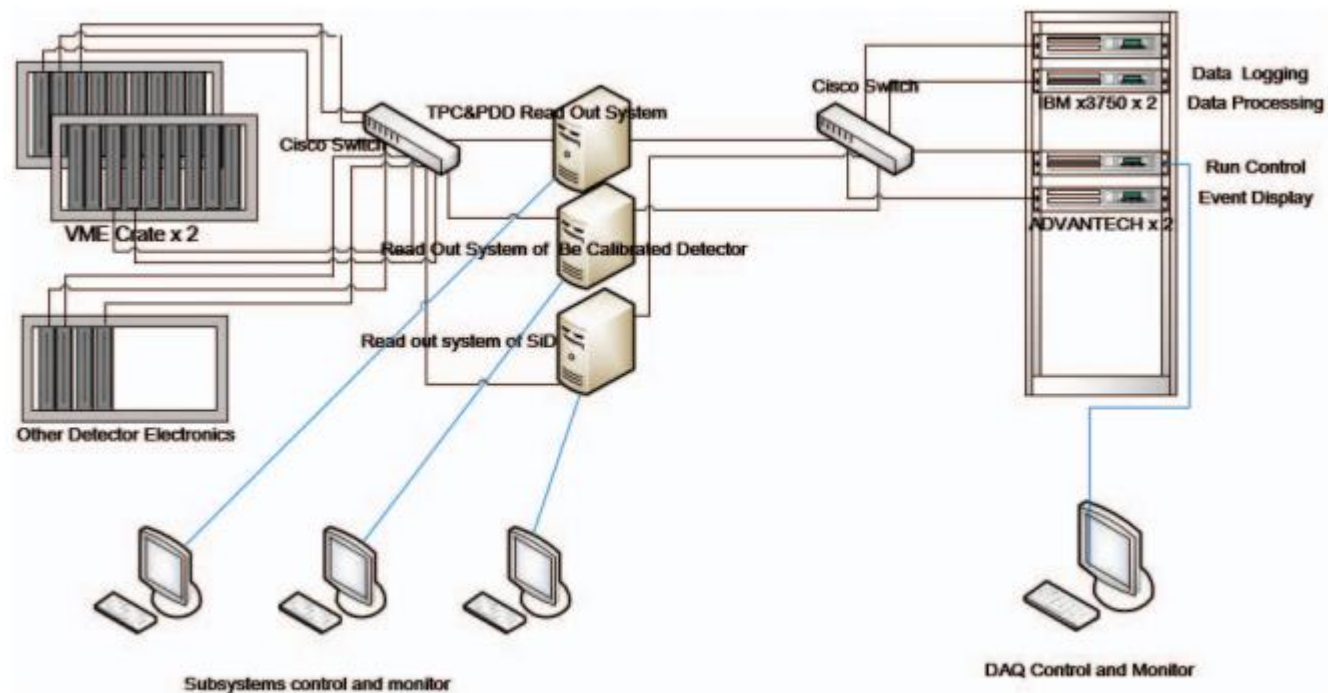
# Hardware Design



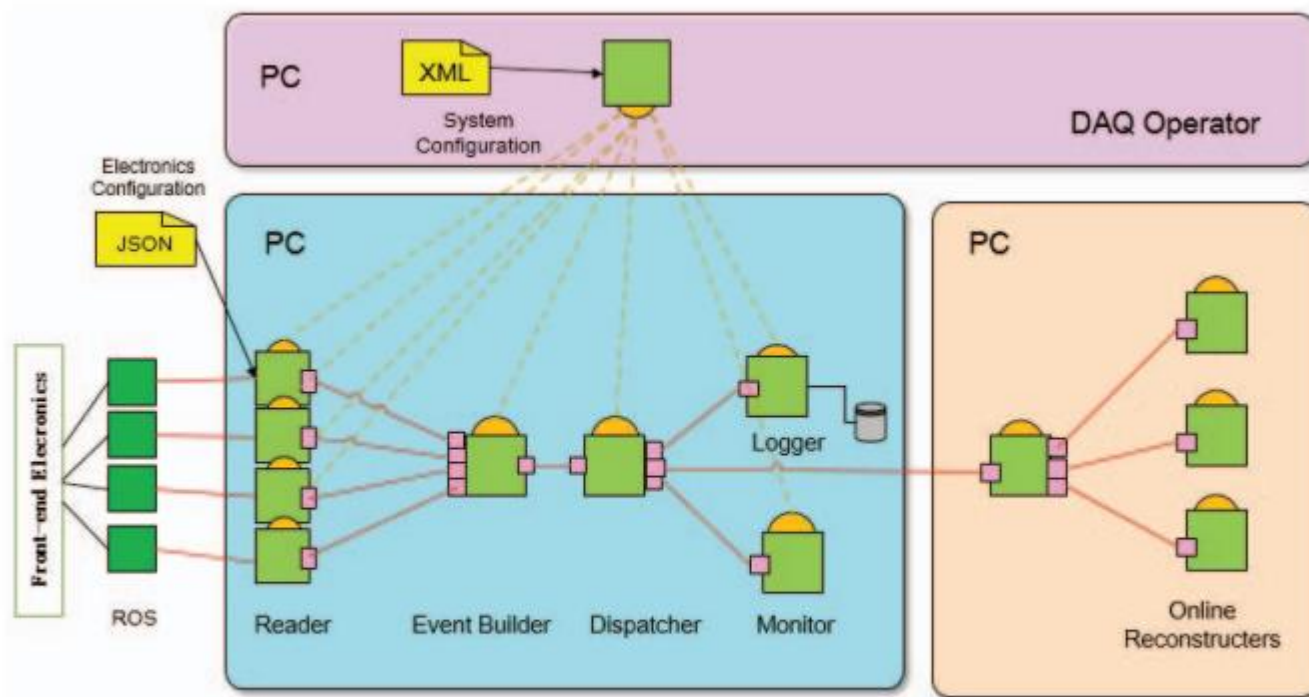Fig. 2. DAQ system architecture design

# Software Design



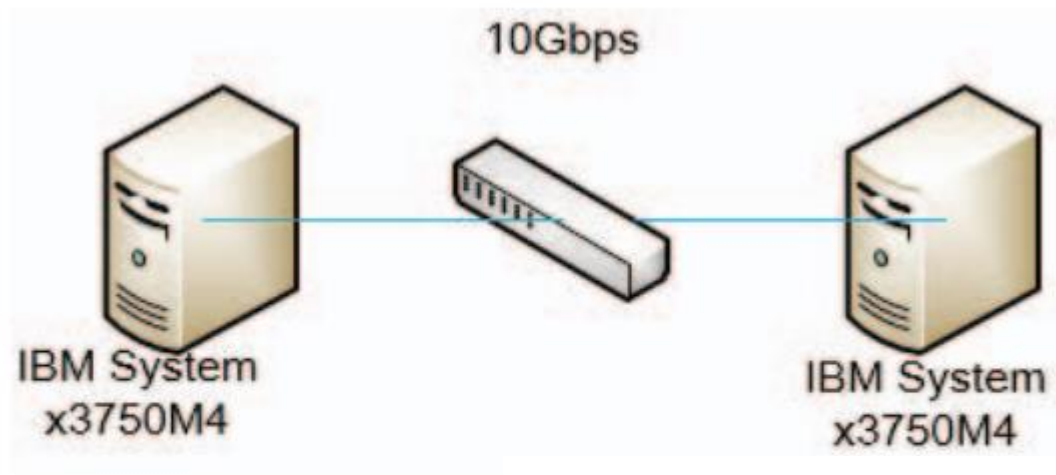Fig. 3. DAQ software architecture design

# Performance



10Gbps

IBM System x3750M4

IBM System x3750M4

Fig. 7.  A measurement setup

**TABLE II**
**SPECIFICATIONS OF TWO COMPUTERS IN MEASUREMENT**

| OS | CentOS Linux 7 64bit |
|---|---|
| CPU | Intel Xeon CPU E5-4610 v2 2.13 GHz |
| Memory | 64GByte |
| Network | 10Gbps |

# Conclusion

Based on DAQ-Middleware framework, DAQ software of beam detection system achieved. Readout system and each component of back-end data flow could be controlled and monitored independently. The test result shows that the DAQ performances well and the design can meet current experiment requirements.

# THANK YOU!