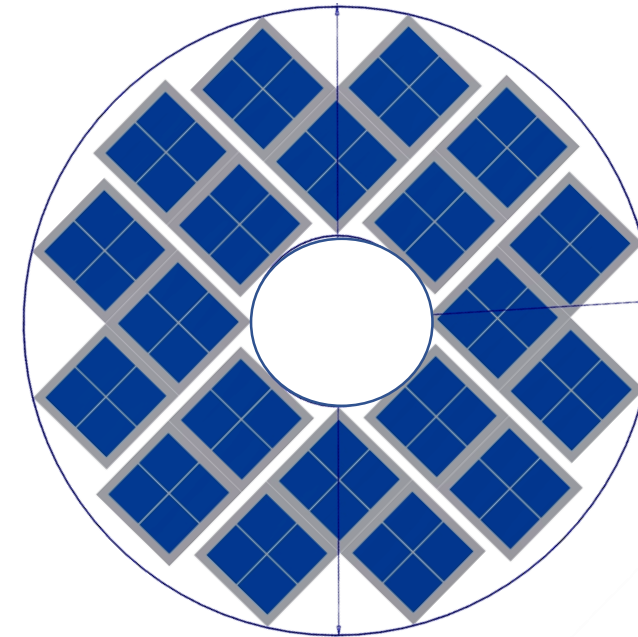
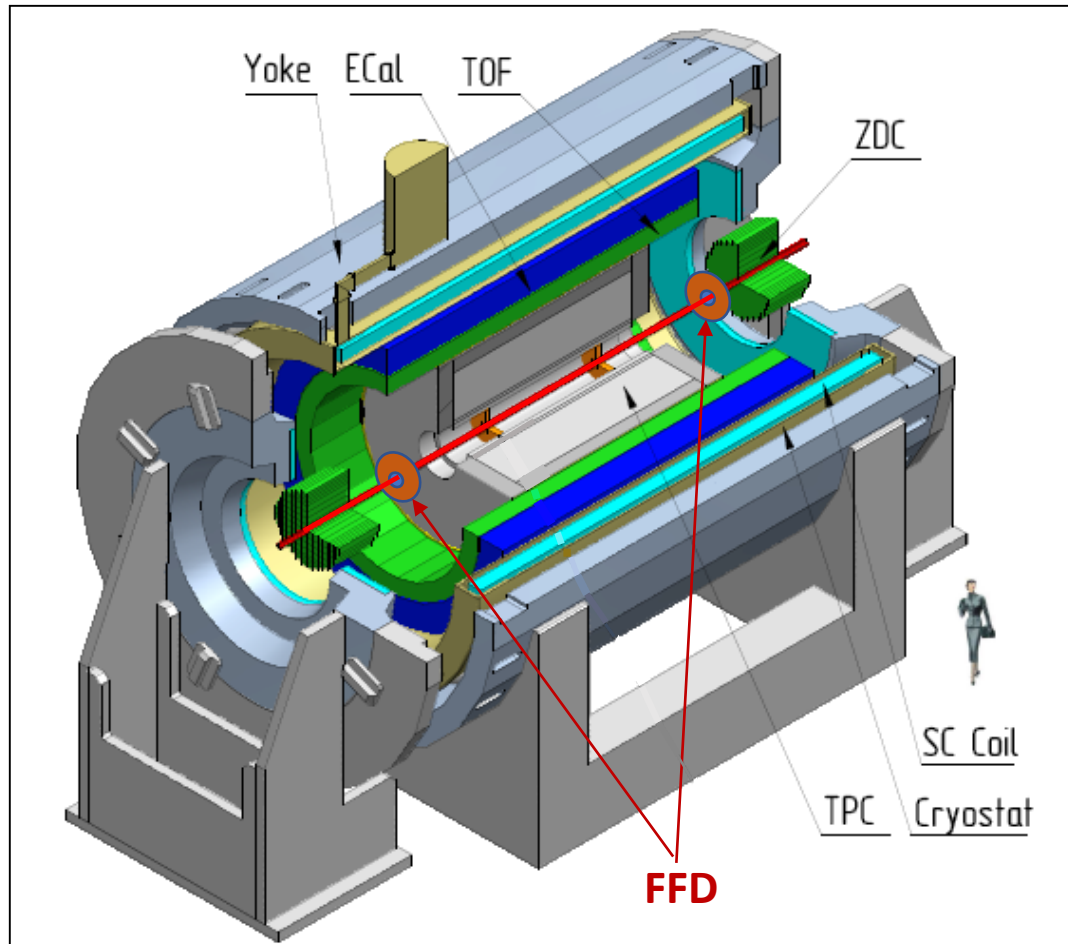

Status of Fast Forward Detector

Vladimir Yurevich

FFD in MPD setup

FFD consists of two sub-detectors with 20 Cherenkov modules each with a located at a distance of 140 cm from the MPD center

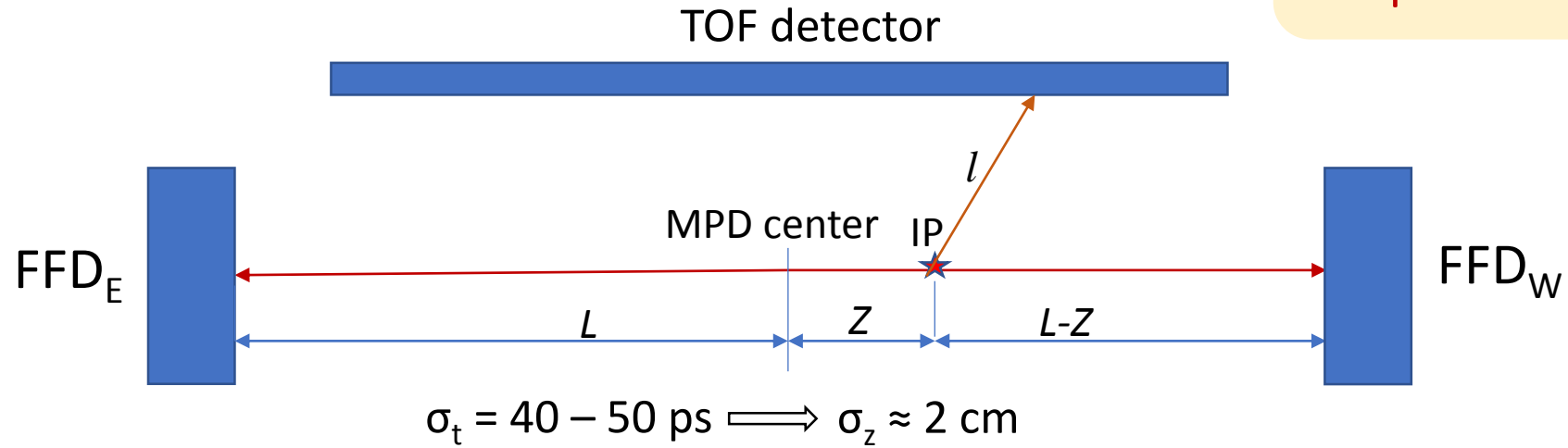


FFD array with 20 modules
and 80-channel granularity

The total active area of FFD is $2 \times 627 \text{ cm}^2$

Aim of FFD in MPD experiment

Vertex trigger
IP position
T0- pulse for TOF



This aim can be reached only for events with pulses from both FFD sub-detectors

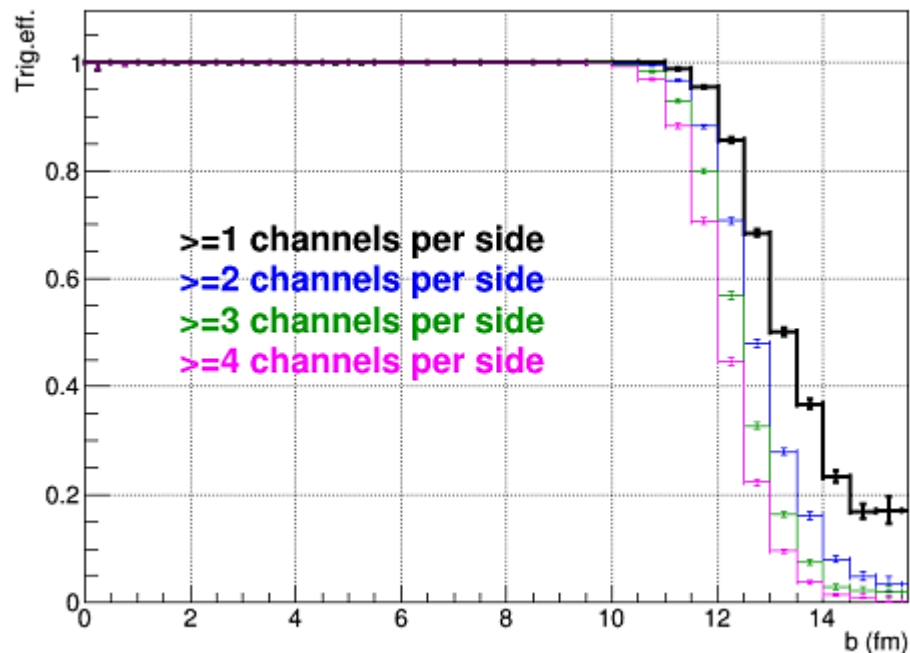
Au + Au collisions	
FFD z-vertex resolution	Z-vertex can be reconstructed within $ Z_{\text{vertex}} < 140 \text{ cm}$
MC simulation	with a resolution $< 2 \text{ cm}$ for any centrality at $\sqrt{s} = 11 \text{ GeV}$
Viktor Ryabov	$< 3 \text{ cm}$ for central & semi-central coll. at $\sqrt{s} = 5 \text{ GeV}$

Importance of FFD for events with low multiplicity of tracks in TPC

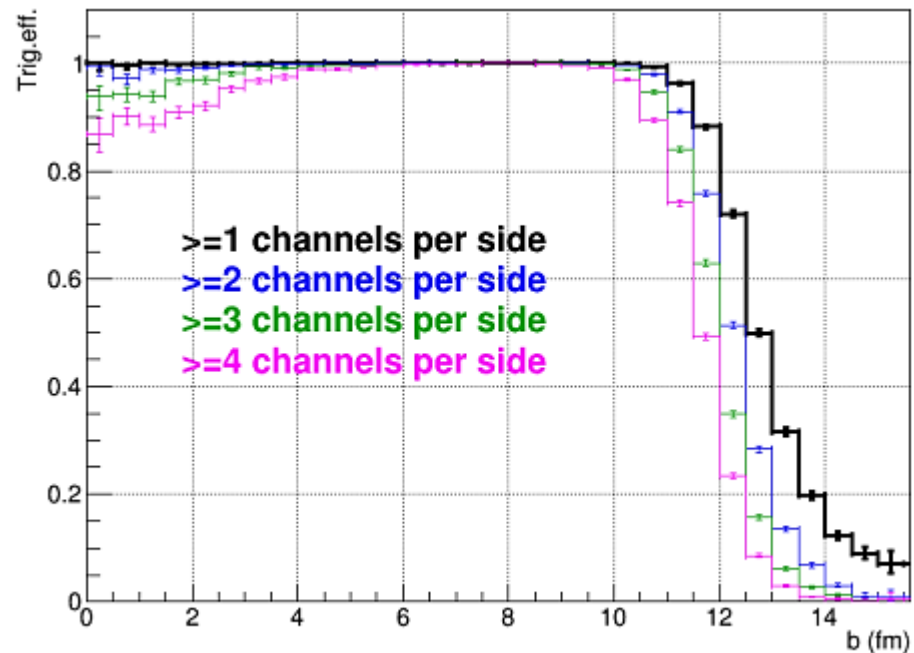
FFD trigger efficiency

DCM-QGSM-SMM
MC simulation
Viktor Ryabov

Au + Au $\sqrt{s} = 11$ GeV

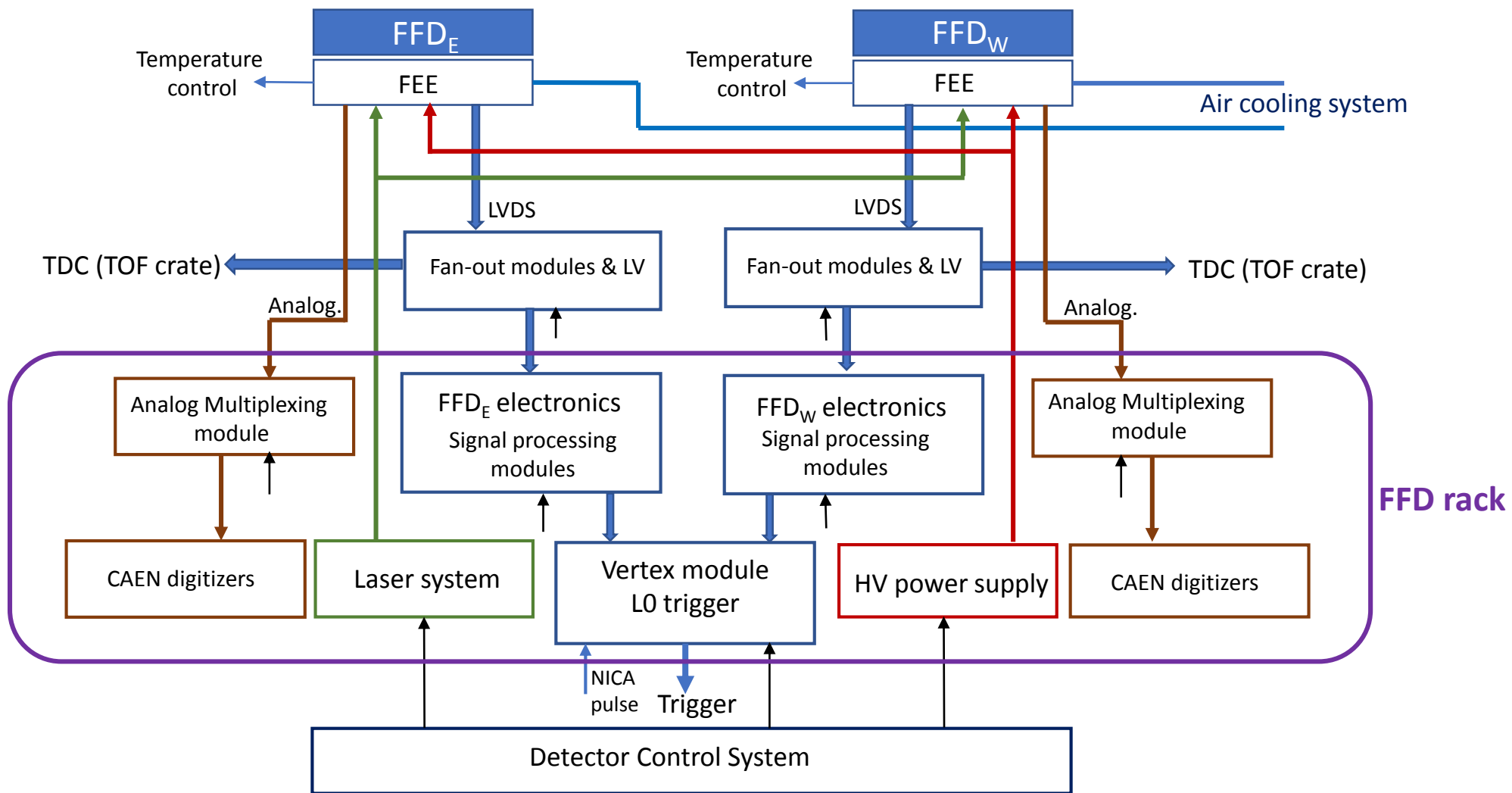


Au + Au $\sqrt{s} = 5$ GeV



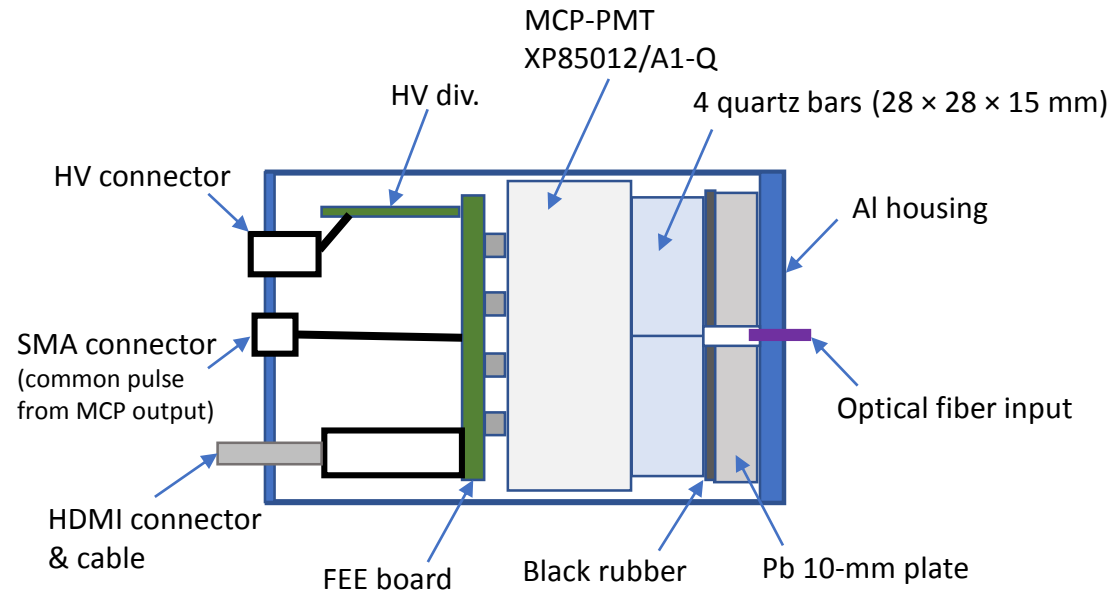
- Efficiency is $\sim 100\%$ in central and semi-central collisions
- “at least one-channel per side” is a preferred option for FFD triggering

Fast Forward Detector sub-systems



FFD modules

Concept

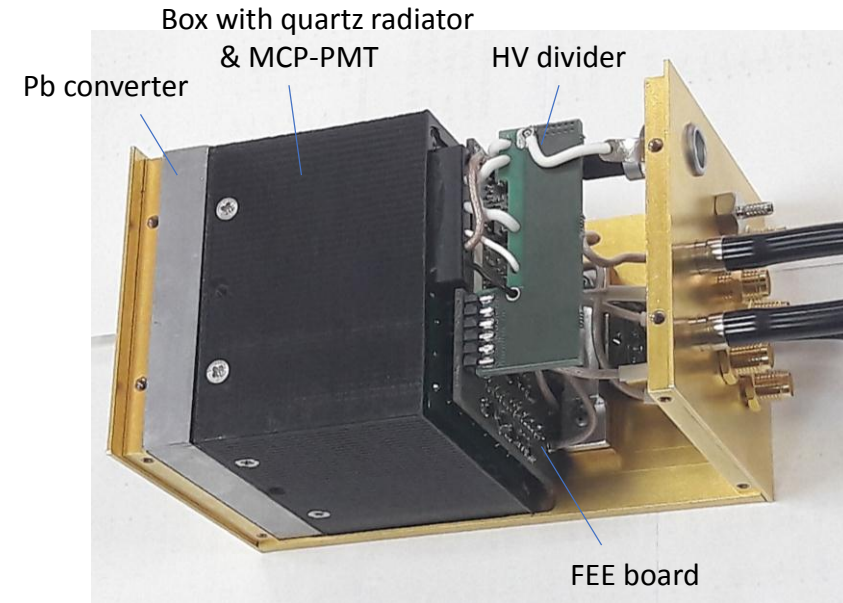


FFD module size: $64 \times 64 \text{ mm}^2$

Quartz radiator size: $56 \times 56 \text{ mm}^2$

Occupancy: 76.6%

Real modules

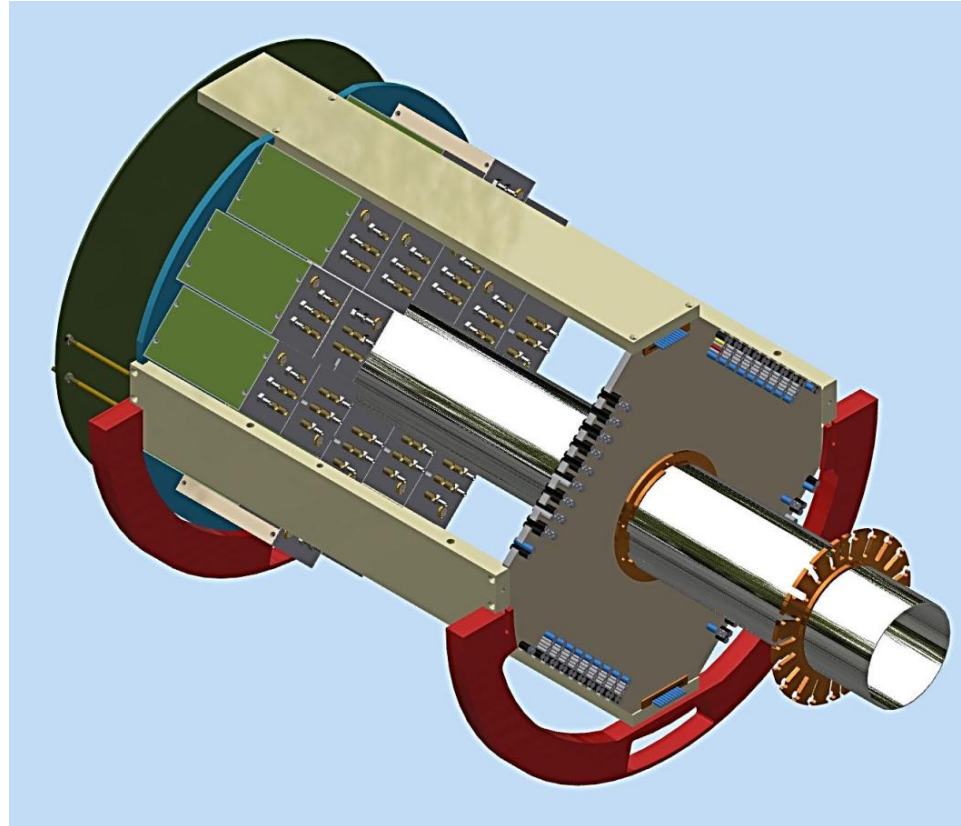


FFD module

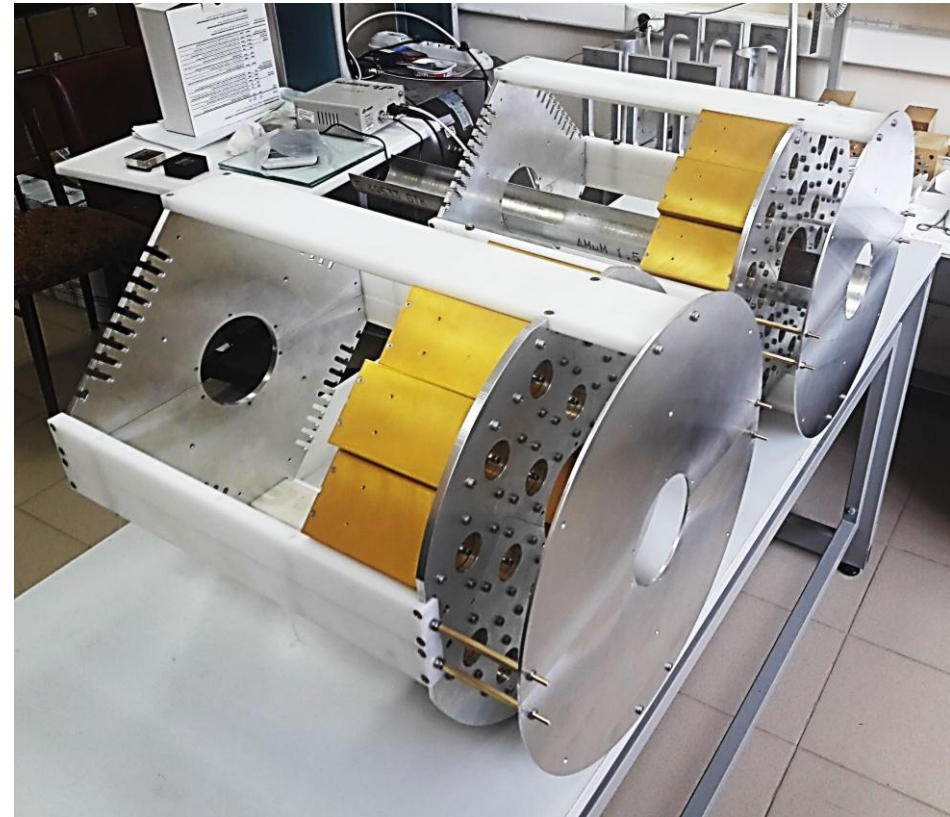
All 40 detector modules are ready for final tests and installation

FFD Sub-Detectors

Concept & Design



Real Detector mechanics



All sub-detector mechanics is ready including installation tools

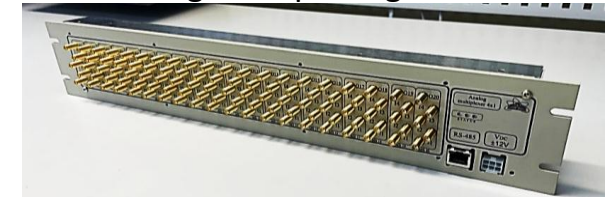
Status of Electronics

Fan-out modules & LV	The module with fan-outs of pulses is ready for production LV PS module prototype tested, ready for production
Analog Multiplexing modules	Modules were produced and tested in 2022
Signal processing modules	Signal processor prototype has been developed and tested, Production in 2023
Vertex module L0 trigger	Concept is ready, production and tests in 2023
CAEN digitizers	Modules are available, tests in 2023

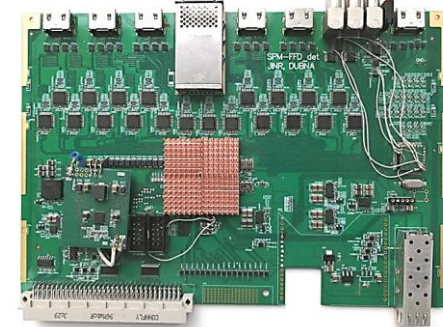
LV PS module



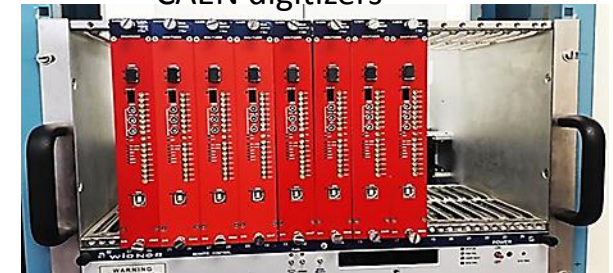
Analog Multiplexing module



Signal processing module



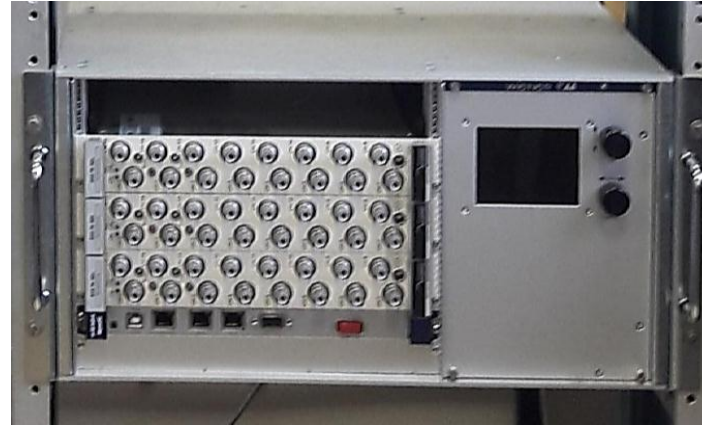
CAEN digitizers



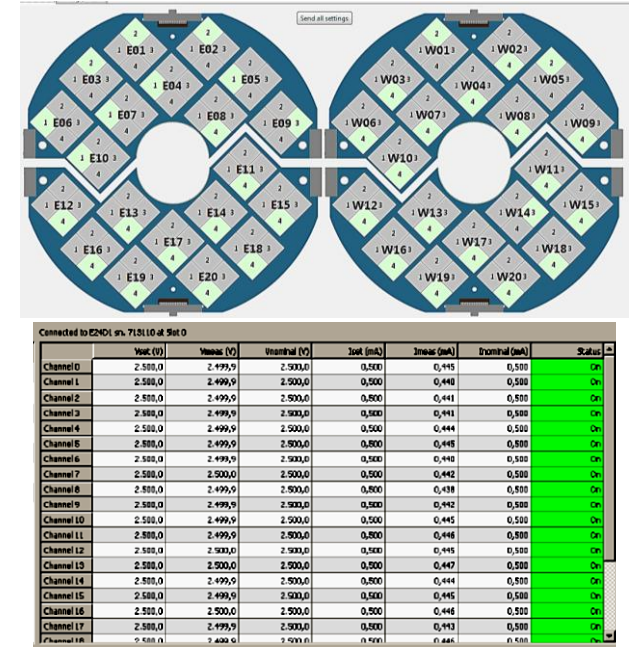
HV power supply system

Available and ready for use

Wiener crate with 48 HV channels



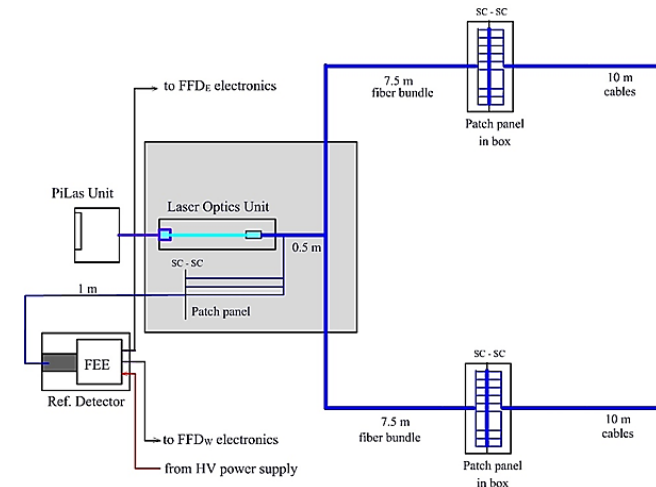
Interface



Laser System

Available and ready for use

- PiLas laser
- Reference detector
- Optical fibers
- Patch panels



Cable system

All set of FFD cables (HV, HDMI, coaxial, optical, MOLEX, etc.) is available.
The FFD cable pass was checked together with cable group
with cable line prototype in 2022.



Cooling system

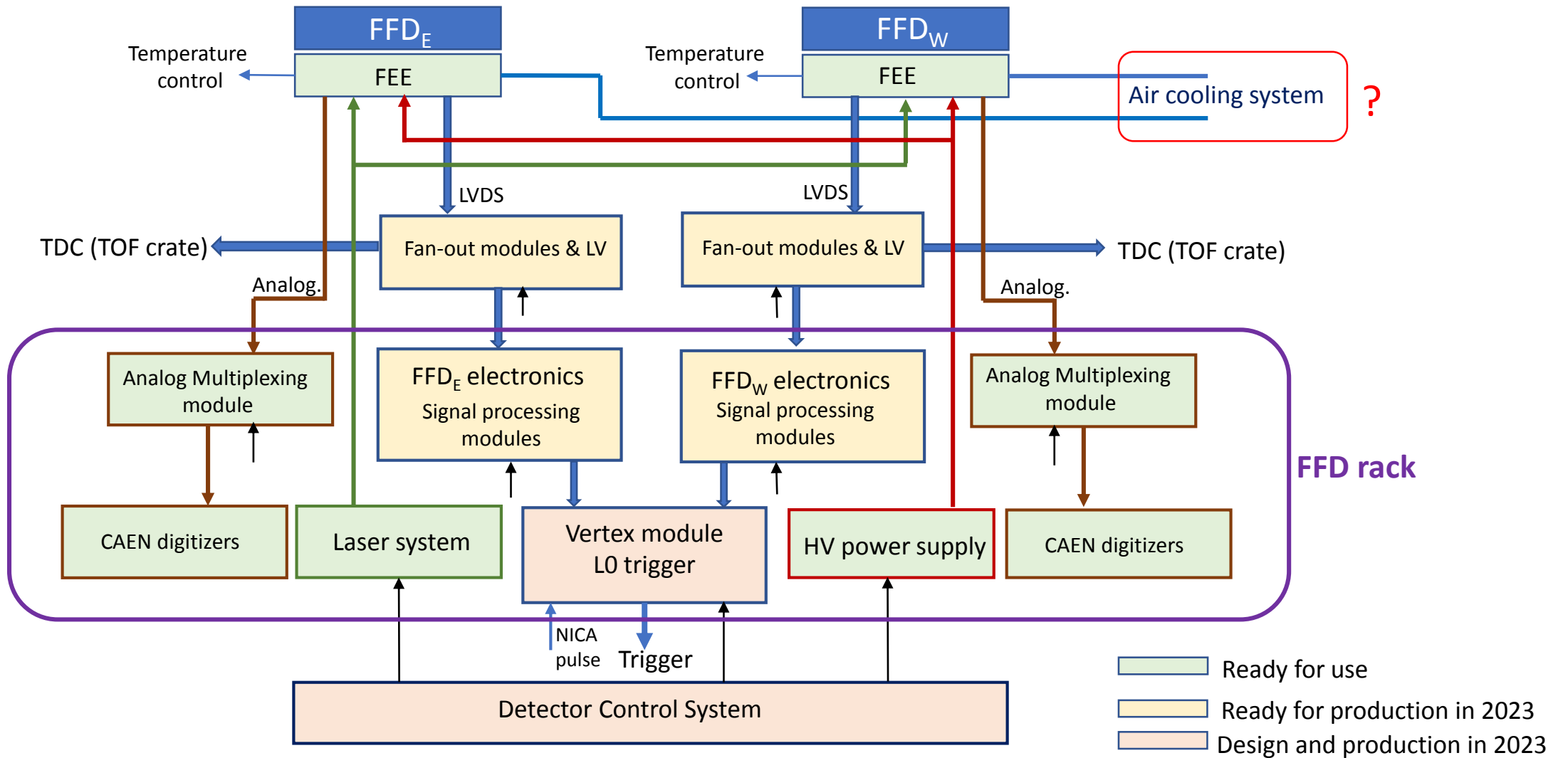
The cooling system was designed for air flow to remove a half of power consumption.
All components were purchased.
Our request for the required air line for FFD was passed to MPD management.



Requirement for cooling:

Flow of cool and dry air or nitrogen of
100 L/min/sub-detector
i.e. 200 L/min/FFD

Fast Forward Detector status



Thank You for Your Attention!
