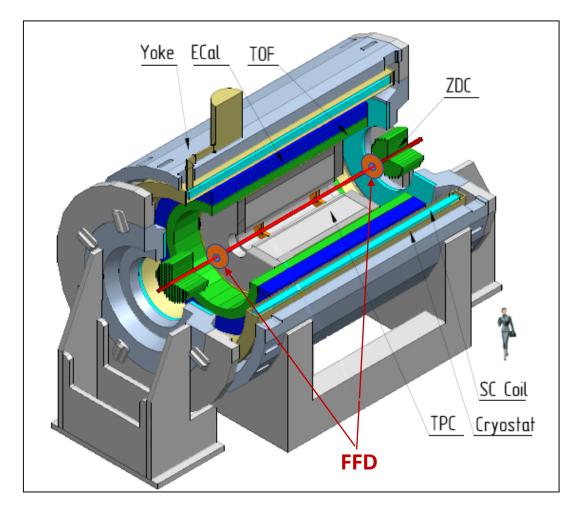
Status of Fast Forward Detector

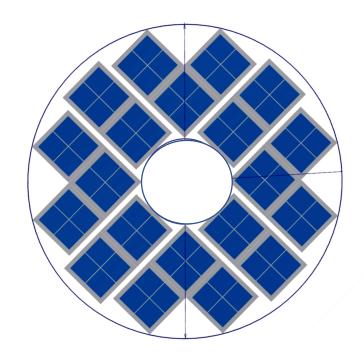
Vladimir Yurevich

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



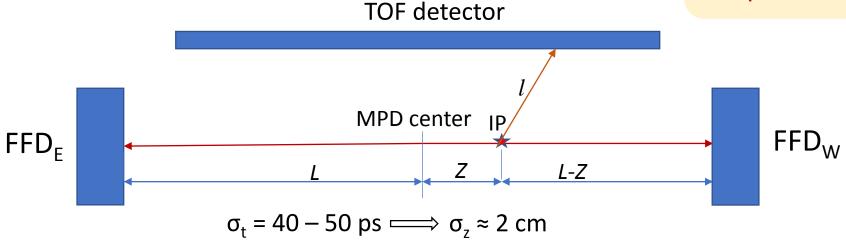


FFD array with 20 modules and 80-channel granularity

The total active area or FFD is 2×627 cm²

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

FFD z-vertex resolution

MC simulation Viktor Ryabov

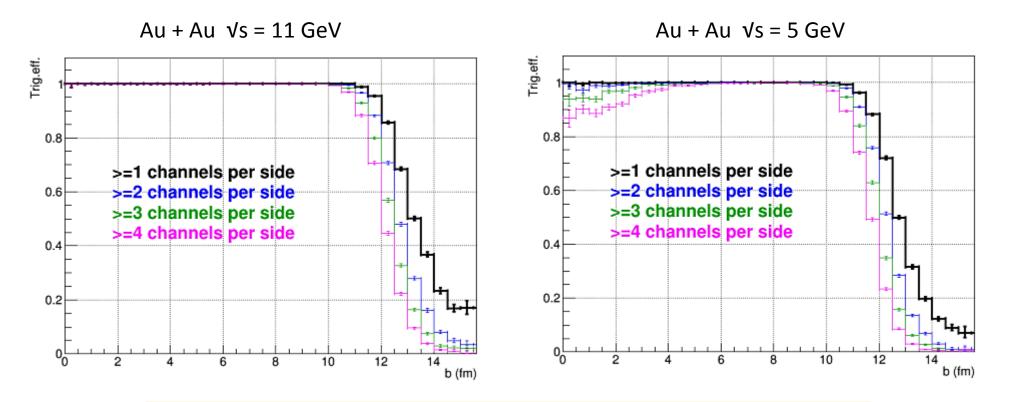
Au + Au collisions

Z-vertex can be reconstructed within |Zvertex| < 140 cm with a resolution < 2 cm for any centrality at Vs = 11 GeV < 3 cm for central & semi-central coll. at Vs = 5 GeV

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

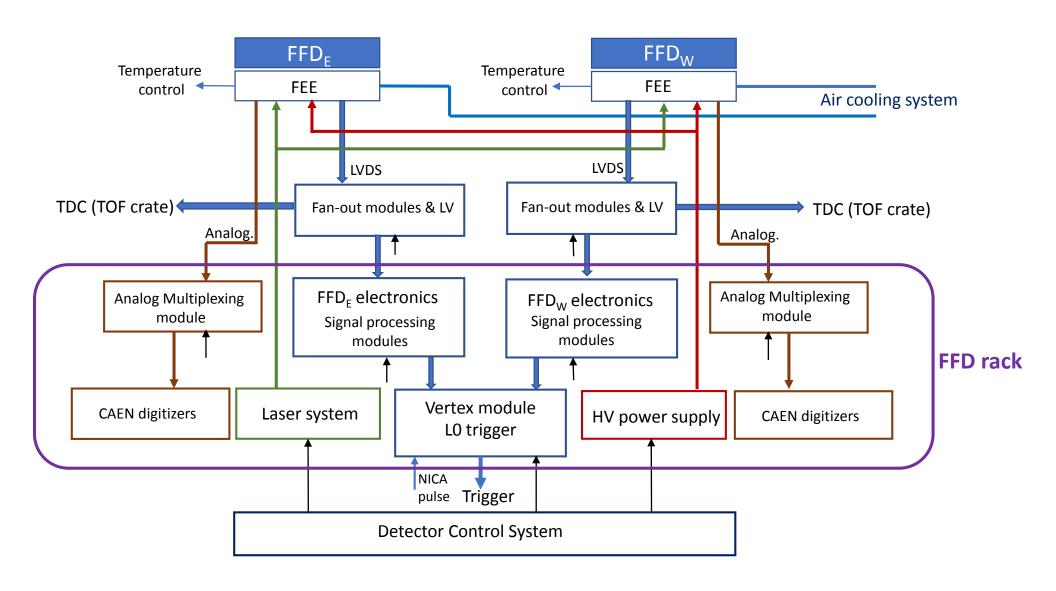
FFD trigger efficiency

DCM-QGSM-SMM MC simulation Viktor Ryabov



- Efficiency is ~ 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

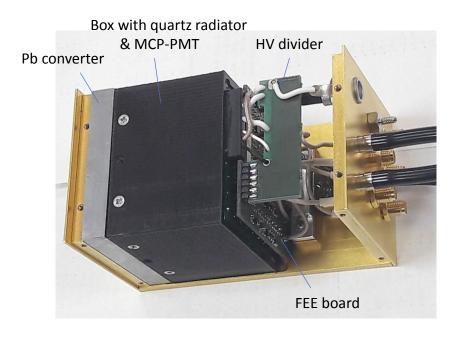
MCP-PMT XP85012/A1-Q 4 quartz bars (28 × 28 × 15 mm) HV connector (common pulse from MCP output) HDMI connector & cable FEE board Black rubber Pb 10-mm plate

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

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

Occupancy: 76.6%

Real modules

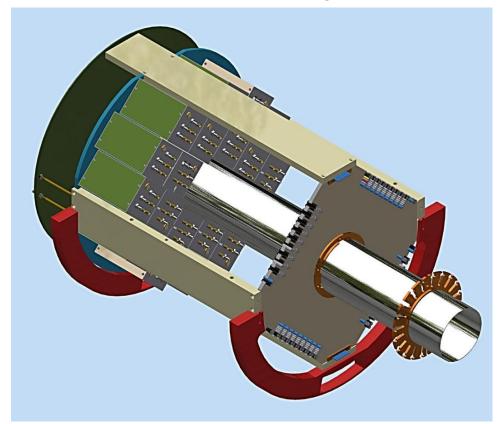


FFD module

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		

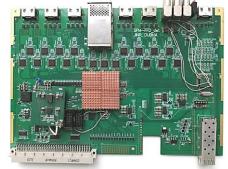
LV PS module



Analog Multiplexing module



Signal processing module



CAEN digitizers

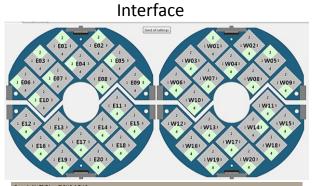


HV power supply system

Available and ready for use

Wiener crate with 48 HV channels



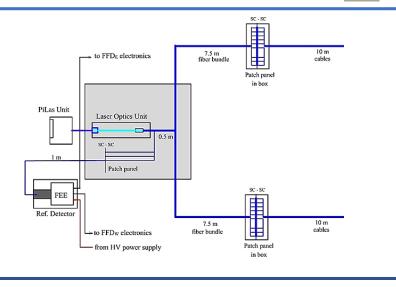


	Yest (V)	Ymeas (V)	Vnominal (V)	lost (mA)	Imeas (mA)	Inominal (mA)	Status	۰
Channel D	2.500,0	2.199,9	2.500,0	0,500	0,445	0,500	On	П
Chennel L	2.500,0	2.499,9	2.500,0	0,500	0,440	0,500	On	П
Channel 2	2.500,0	2.499,9	2.500,0	0,500	0,441	0,500	On	П
Channel 3	2.500,0	2.499,9	2.900,0	0,500	0,441	0,500	On	П
Channel 4	2.500,0	2.499,9	2.500,0	0,500	0,444	0,500	On	П
Channel 5	2.500,0	2.499,9	2.500,0	0,500	0,445	0,500	On	
Channel 6	2.500,0	2.499,9	2.900,0	0,500	0,440	0,500	On	П
Channel?	2.500,0	2.500,0	2.500,0	0,500	0,442	0,500	On	П
Channel 8	2.500,0	2.499,9	2.500,0	0,500	0,438	0,500	On	П
Channel 9	2.500,0	2.499,9	2.900,0	0,500	0,442	0,500	On	
Channel 10	2.500,0	2.499,9	2.500,0	0,500	0,445	0,500	On	
Channel LL	2.500,0	2.499,9	2.500,0	0,500	0,446	0,500	On	Ш
Channel LZ	2.500,0	2.900,0	2.900,0	0,500	0,445	0,500	On	П
Chennel L3	2.500,0	2.500,0	2.500,0	0,500	0,447	0,500	On	8
Channel 14	2.500,0	2.499,9	2.500,0	0,500	0,444	0,500	On	8
Channel LS	2.500,0	2.499,9	2.500,0	0,500	0,445	0,500	On	ĕ
Channel L6	2.500,0	2.500,0	2.500,0	0,500	0,446	0,500	On	â
Channel L7	2.500,0	2.199,9	2.900,0	0,500	0,113	0,500	On.	8

Laser System

Available and ready for use

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



All set of FFD cables (HV, HDMI, coaxial, optical, MOLEX, etc.) is available.

Cable system 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.

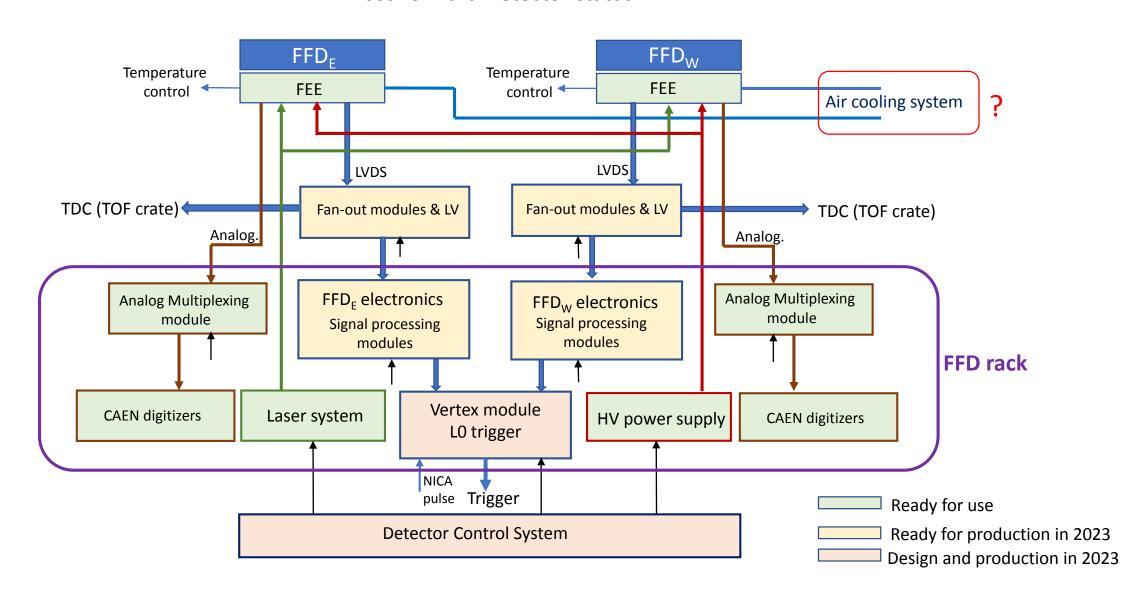
Our request for the required air line for FFD was passed to MPD management.



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!