Current status

Laboratory of photodetectors testing at DLNP

Anfimov Nikolay
Head of the Lab.

Outline

- Physical motivation to build the Lab:

- COMPASS (CERN)

- JUNO (IHEP, China)

- NOvA (Fermilab, USA)

- Current status of the Lab:

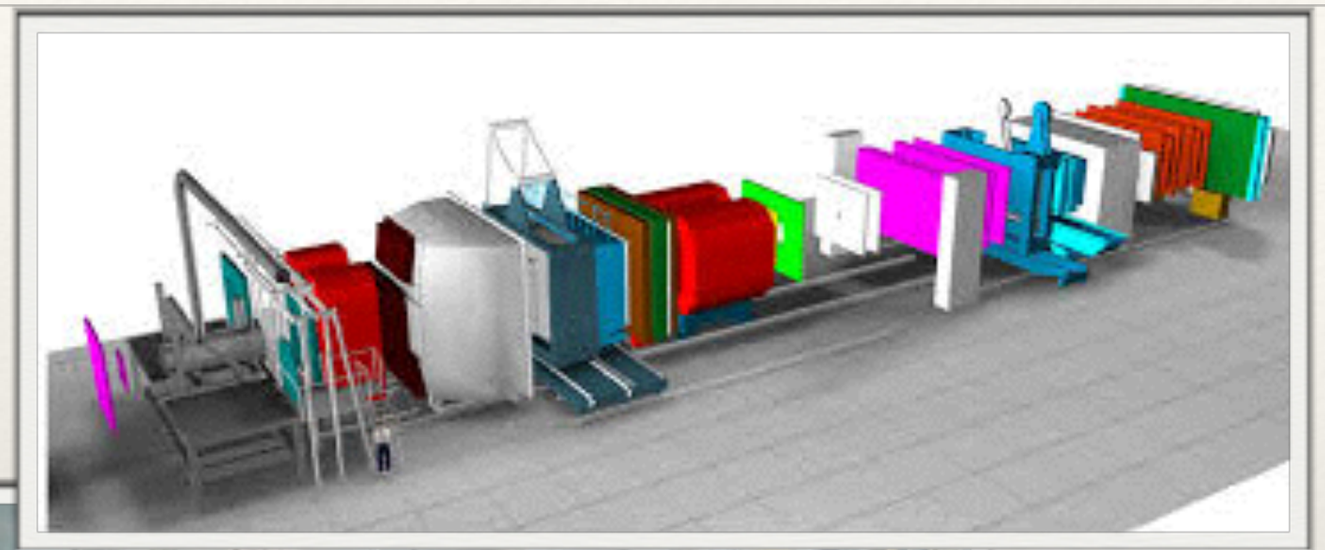
- Black room, PMT scanning station

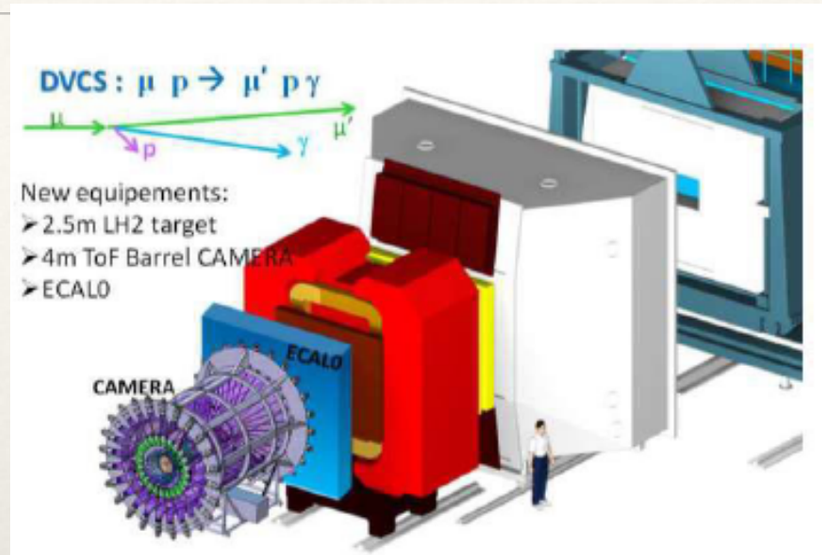
- NOvA Control room, NOvA stand

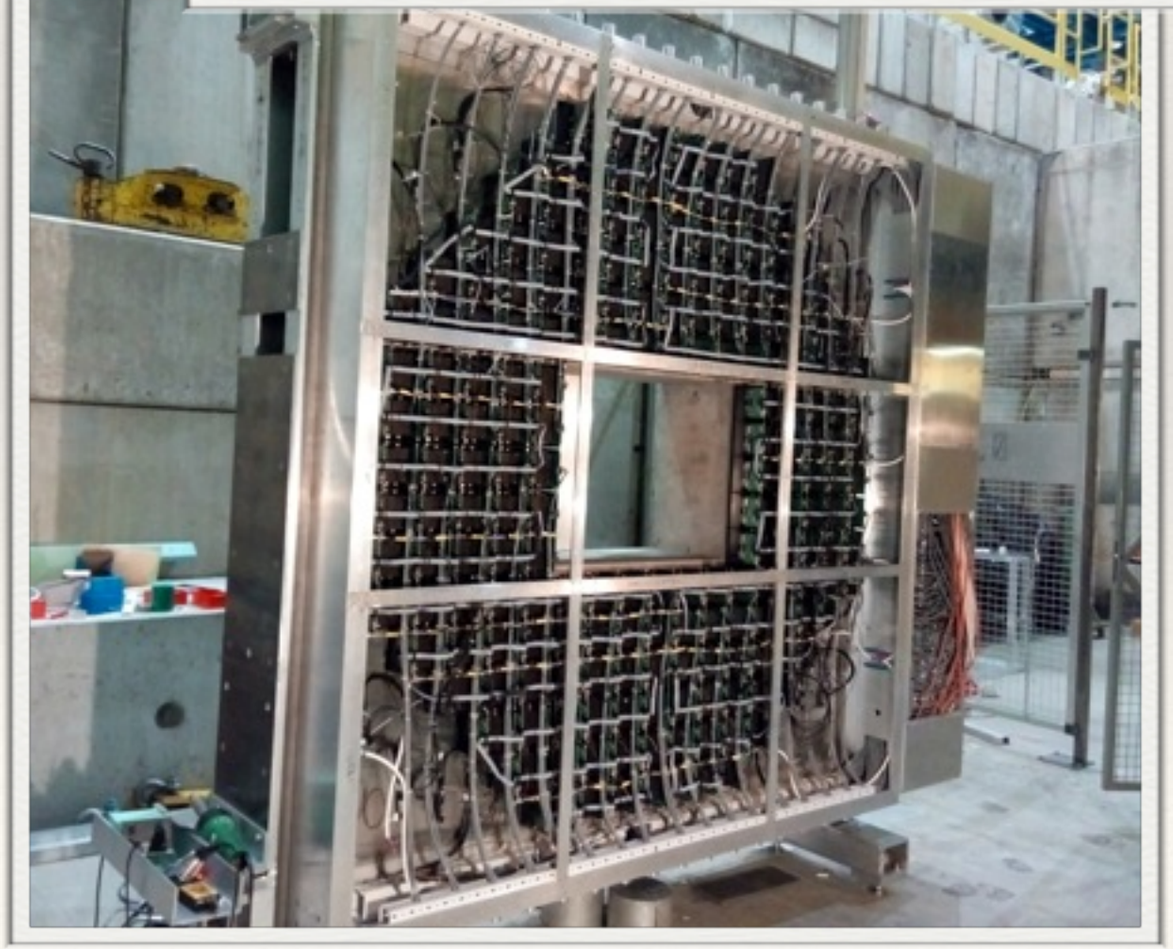
- Assembling facility

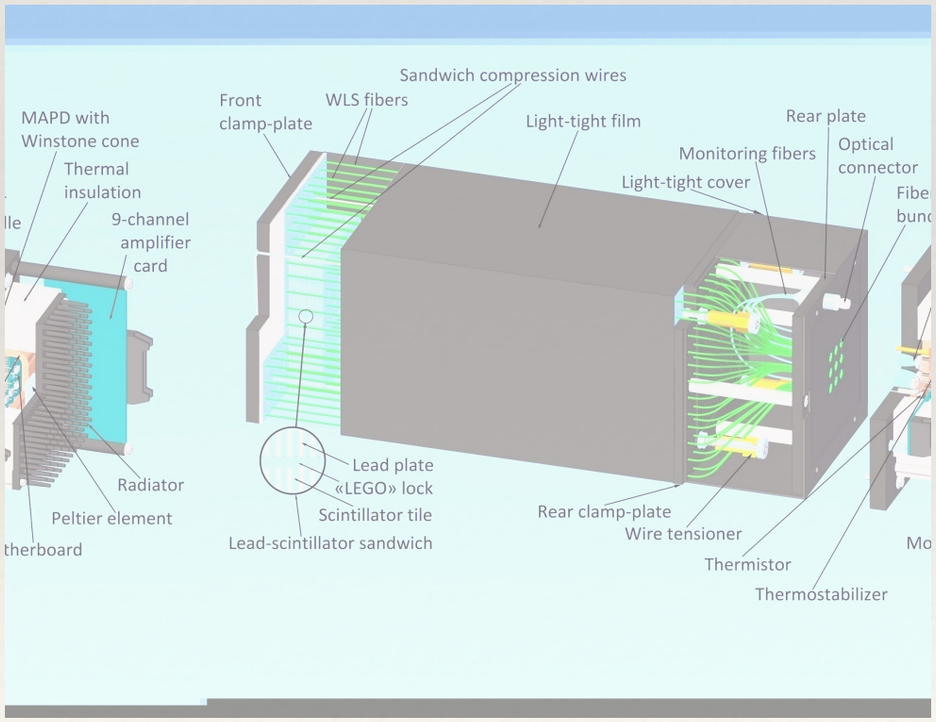
- Working conditions: meeting room, offices, etc…

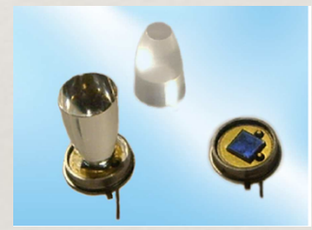
COMPASS (CERN, Switzerland)

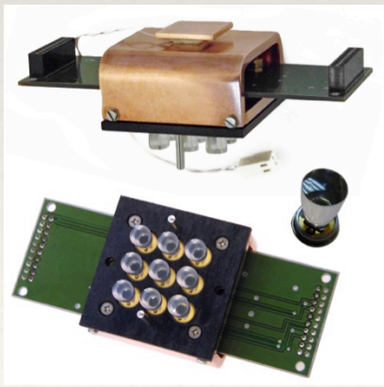






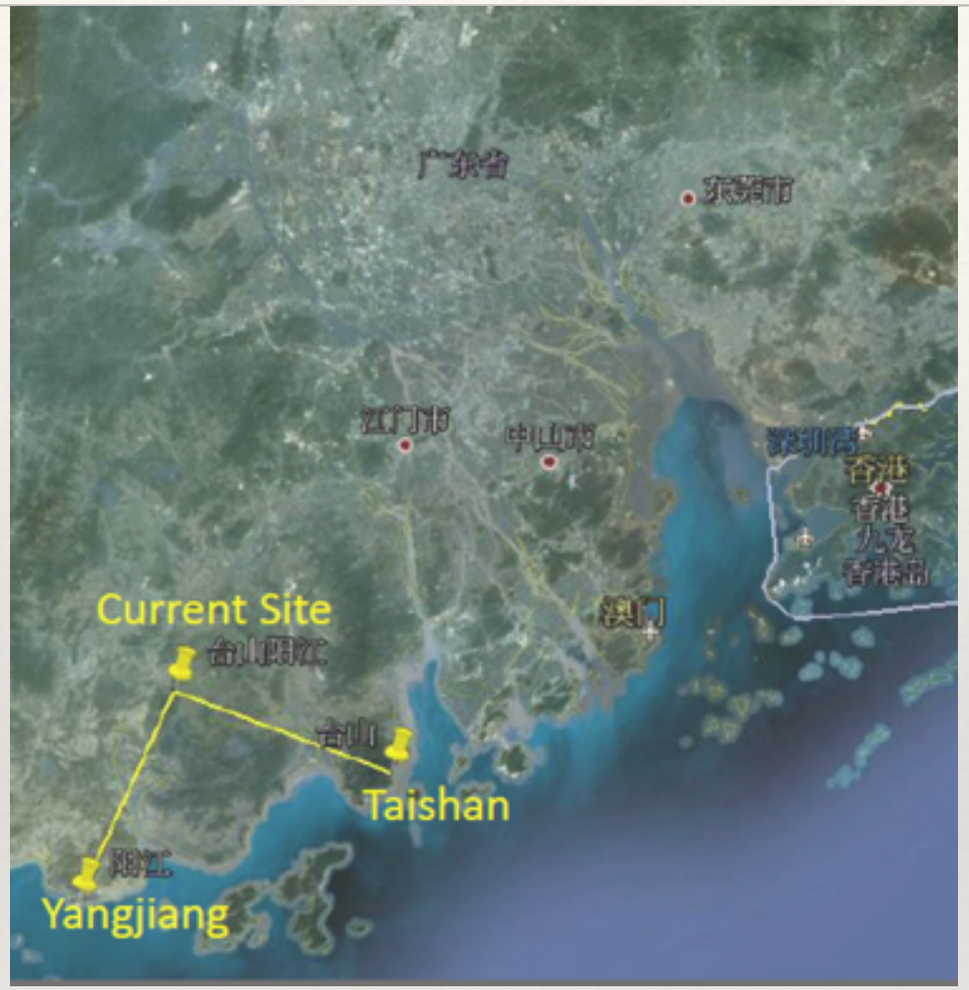




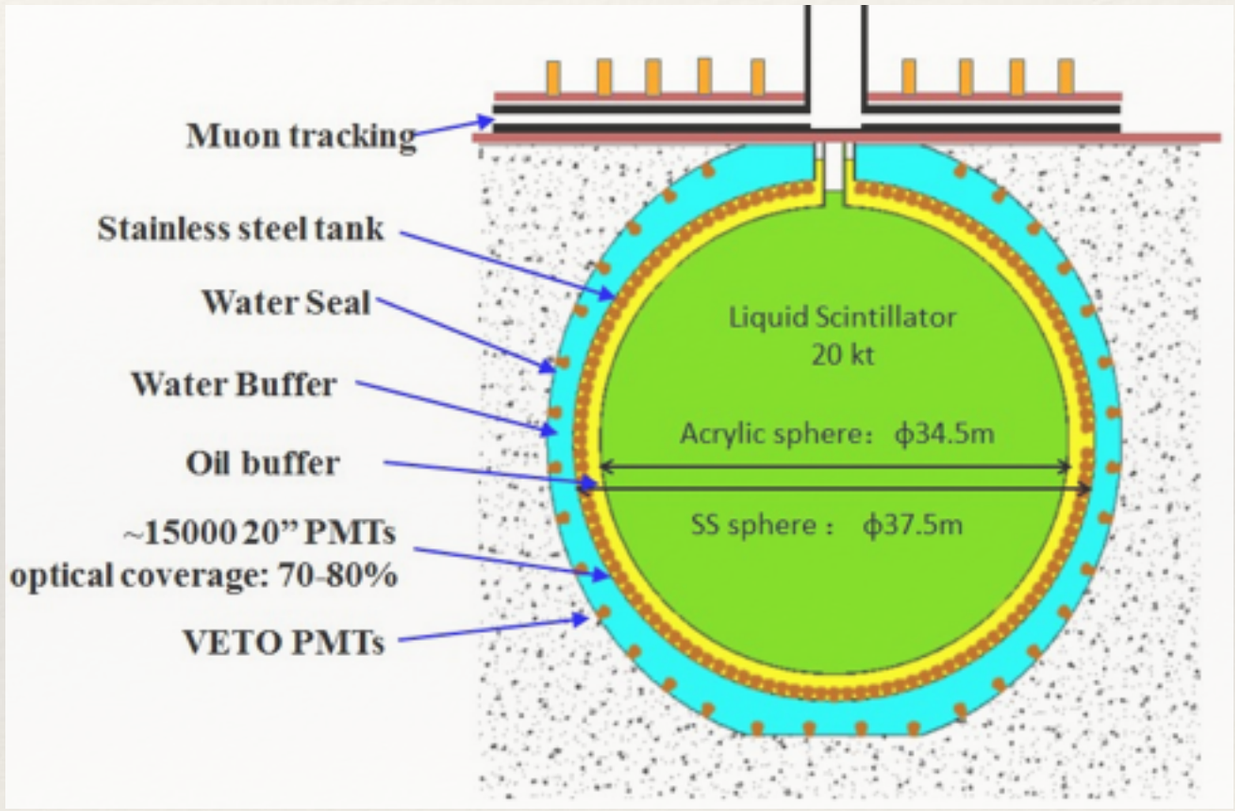


ECAL has been built, commissioned and run

JUNO (Jianmen, China)



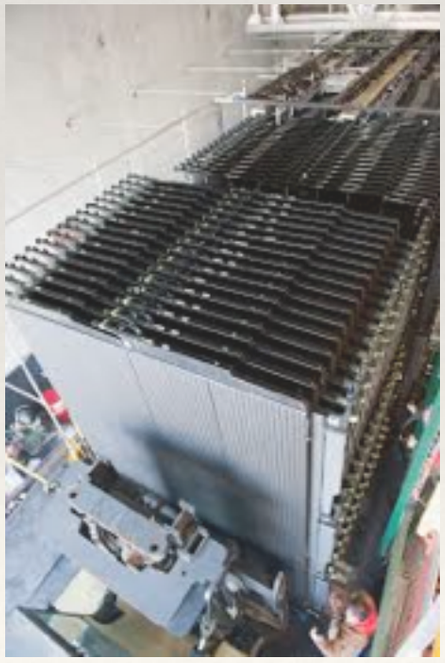
Unique energy resolution < 3% @ 1MeV
Total weight = 20 kt
20 inches PMT (about 20 000 pcs)



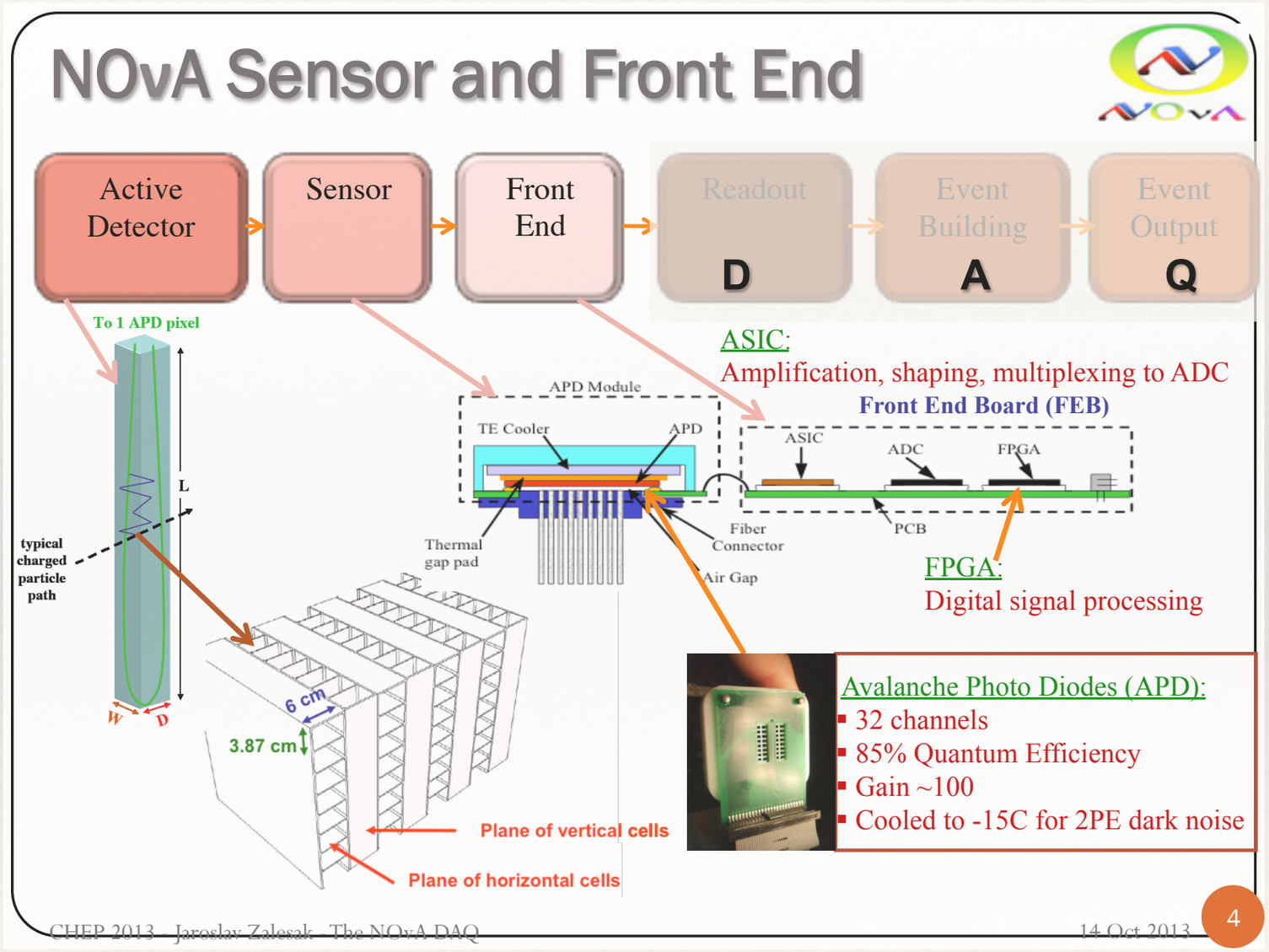
JINR group tasks:

- development of the method for PMT mass testing
- HV-base production
- Earth Magnetic Field shielding

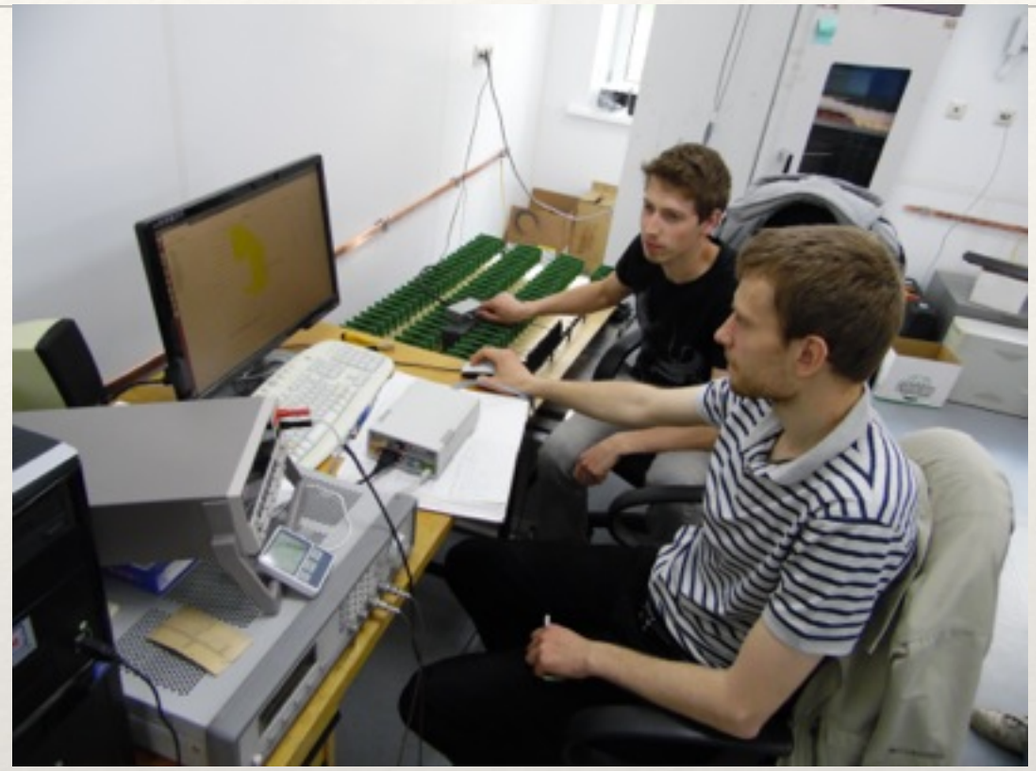
NOvA (Fermilab, USA)



Far detector: ~11k APD, ~340k PVC tubes



Assembling room

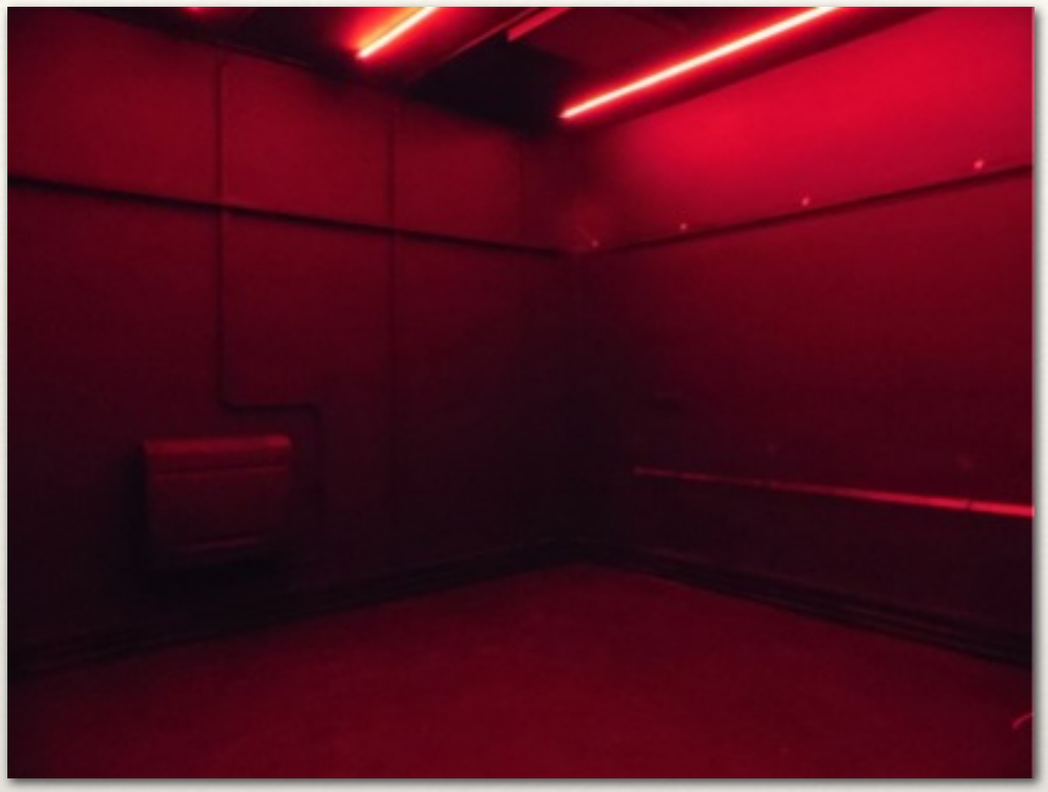


Here 200 Detection Blocks for the COMPASS ECAL0 were assembled, tested and calibrated

Hamamatsu 12860 HQE

JUNO PMT

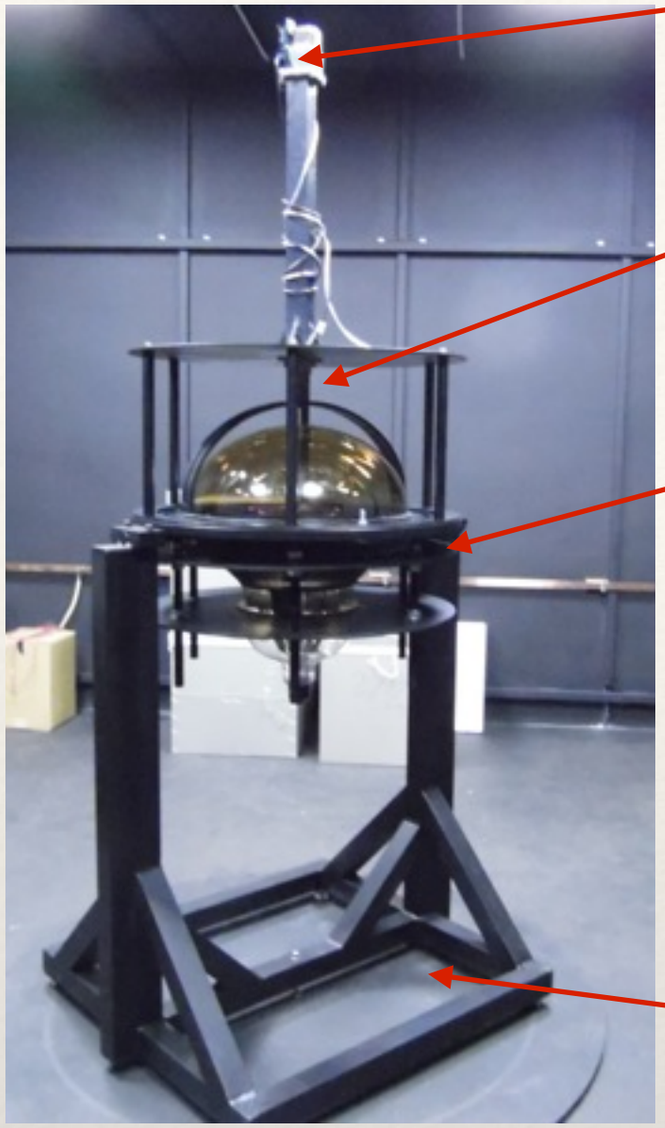
Hamamatsu 12860 is a 20 inches PMT that one of the candidate PMT for the JUNO

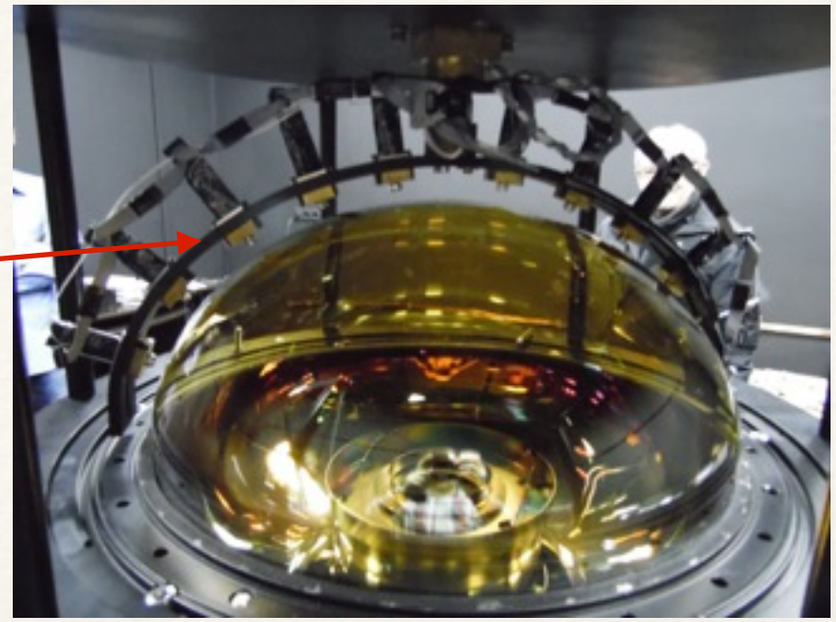


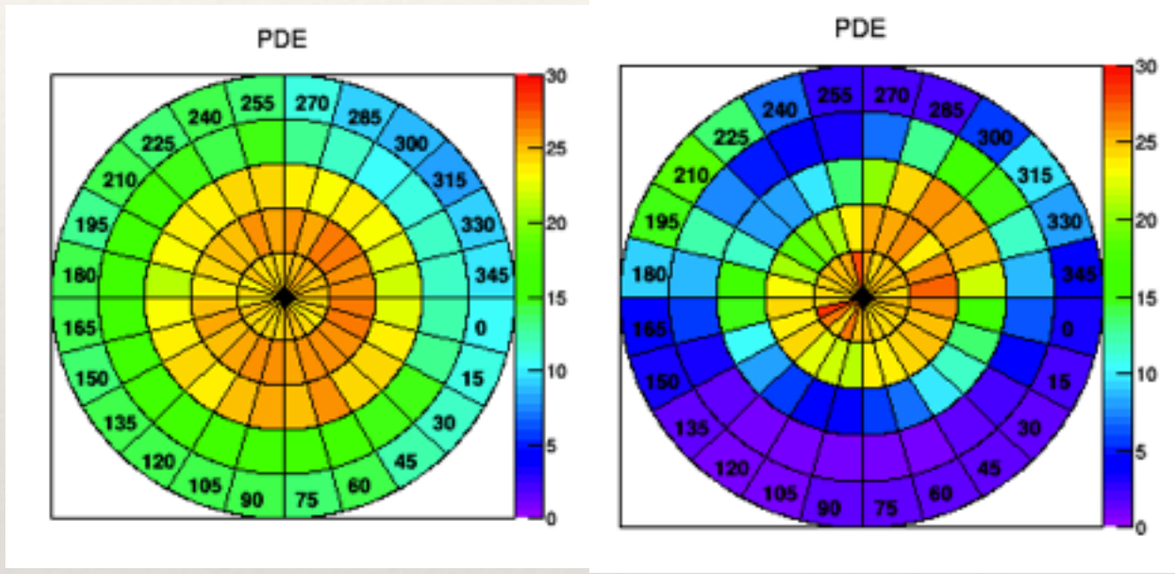
Black room

PMT Lab (JINR)

1. Light insulation
2. Red & white light
3. Electromagnetic shielding
4. Reduction of the Earth magnetic field (>10 times)
5. HV-off system
6. Climate system



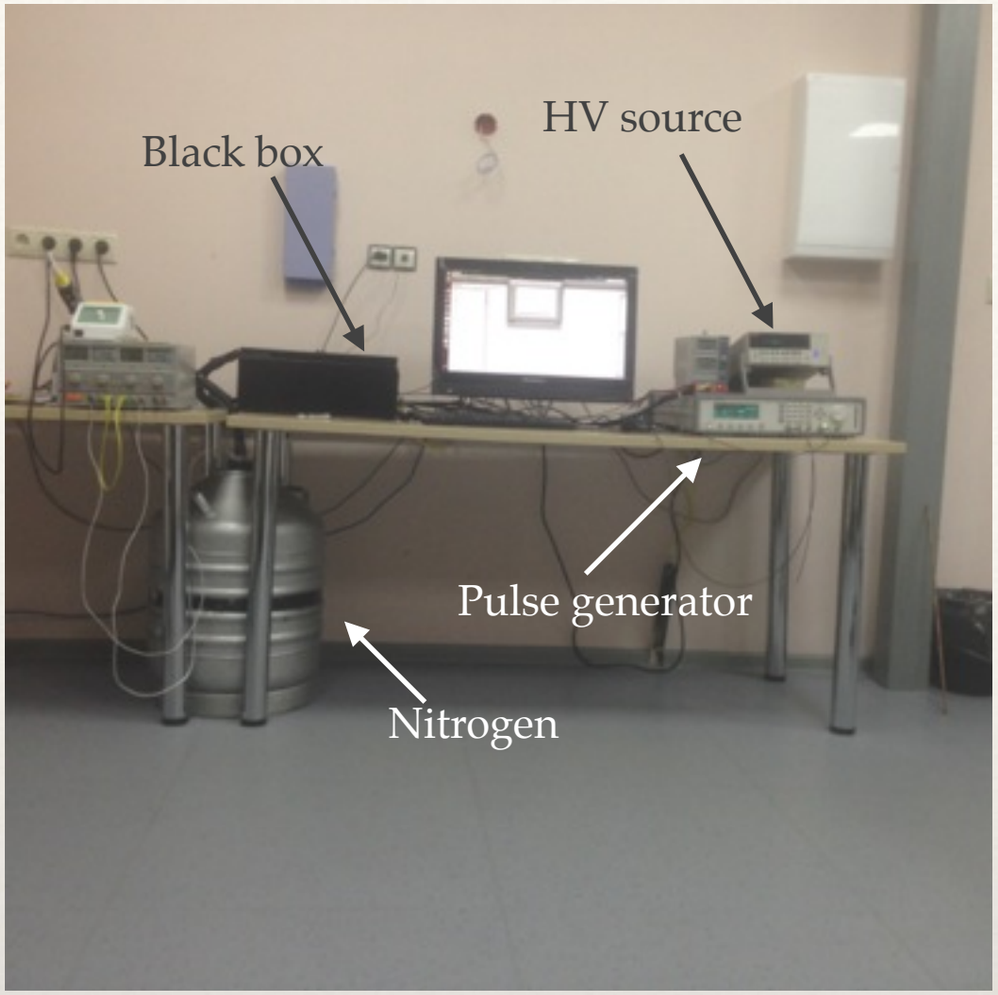


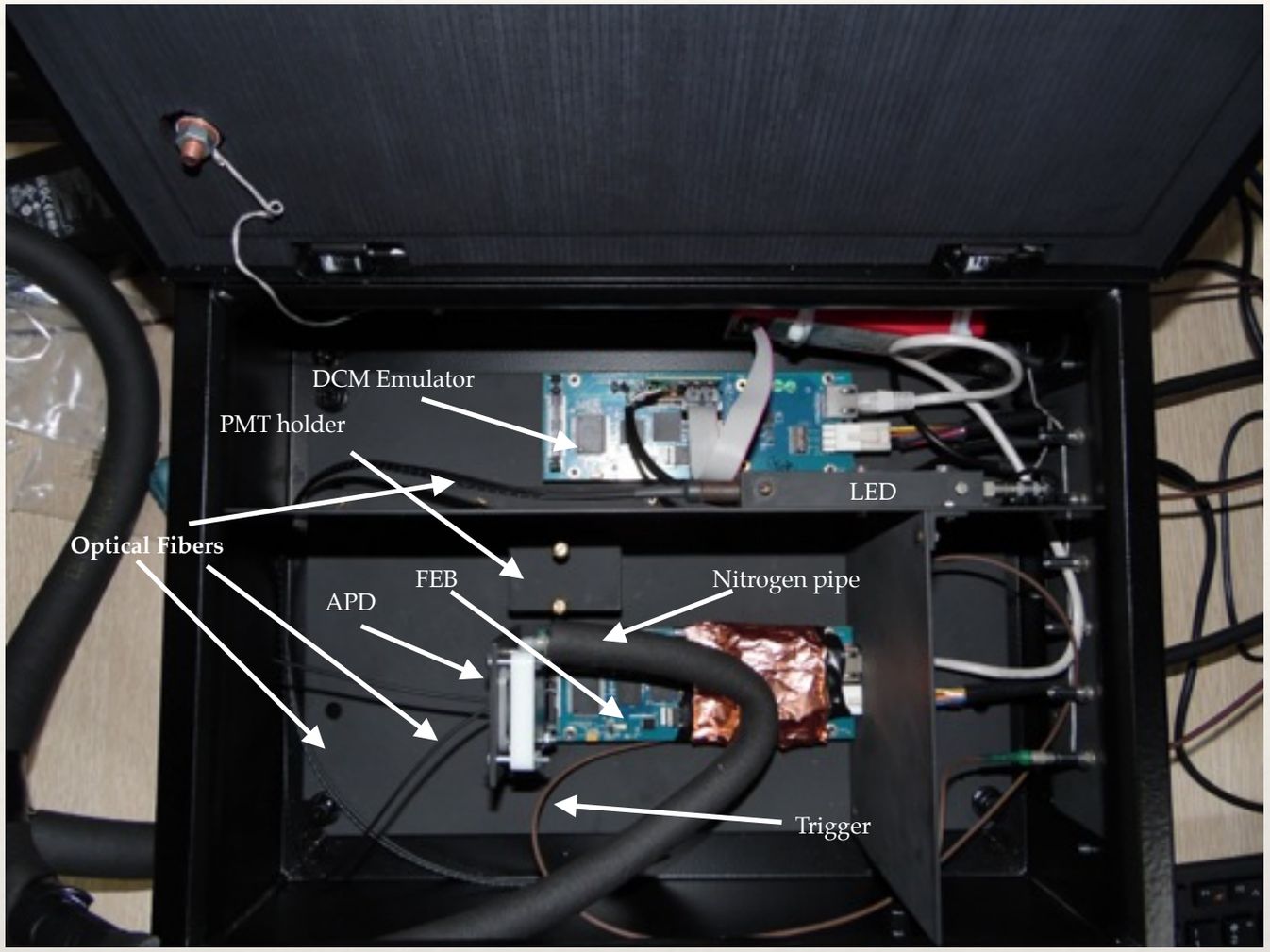


Scanning system for 20″ PMT (8″ optional)

Scanning system

1. 5 LEDs on each side cover zenith with step 15 deg.
2. Rotating frame scanning whole azimuth with precision < 1 deg.
3. Support rotation allows to perform measurements in different Earth and residual magnetic fields directions
4. Base rotation 360 deg.





Bench for testing native NOvA electronics

NOvA test bench @JINR

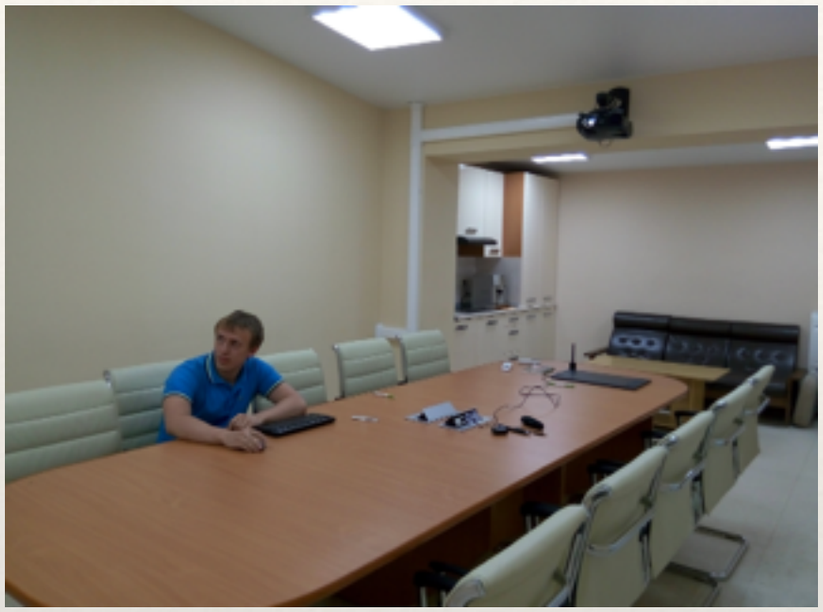
Operational features:

- Amplitude sag (Flash) is due to improper electrical decoupling of APD pixels on PCB and small capacitance value
- Signal shaping depends on pulse amplitude and duration (important for timing and exotics)
- …

NOvA ROC

- Broad-band internet ~ 1 Gbps (20 Gbps optional)
- Power cut operational time = 1 hour
- Computers are separate from workplace
- dT(Chicago-Dubna) = 8 (9) hours
- Air cooling system

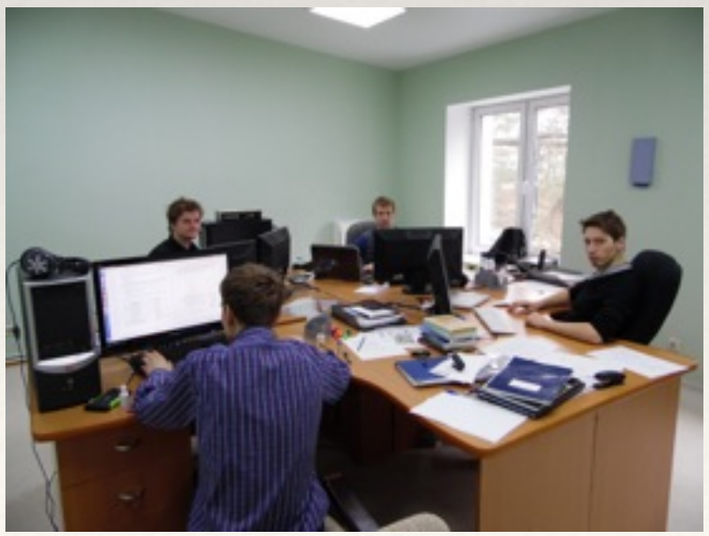
Working conditions



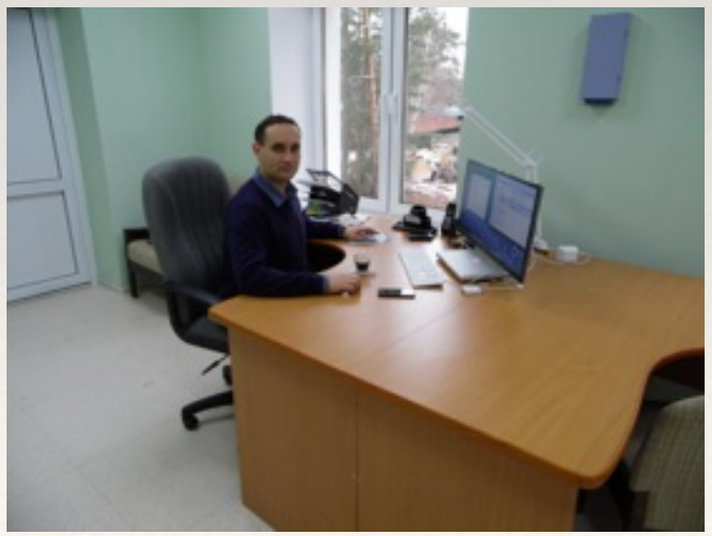
Discussion hall

Watching movies on large Full HD screen :)

Modern kitchen: coffee-machine, MW-oven, hob, frige



PhD students office



Office for staff

Sport option (pull-up bars)

Inviting words

JINR Entrance

THANK YOU FOR YOUR ATTENTION

СПАСИБО ЗА КЛАССНУЮ КОНФЕРЕНЦИЮ!