

# **Photomultiplier Tubes**

**North Night Vision Science & Technology  
(Nanjing) Research Institute Co. Ltd**

**2023**

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## PART 1 Company profile

North Night Vision Science & Technology (Nanjing) Research Institute Co., Ltd. (NVN in short) was formerly known as the Nanjing branch of North Night Vision Technology Co., Ltd.(NNVT in short), which was established in 2000. In order to give full play to Nanjing's regional advantage, policy advantage, industrial cluster advantage and talent advantage, NVN company was incorporated in 2021.



**North Night Vision Science & Technology (Nanjing)  
Research Institute Co., Ltd.**

- ▲ 13,000 m<sup>2</sup>+ area ,super-clean area is about 3700 m<sup>2</sup>.(Include 100000, 10000, 1000 and 100 class clean area)
- ▲ 140 + R&D personnel
- ▲ 150 + patents and independent intellectual property rights
- ▲ 60 + honors

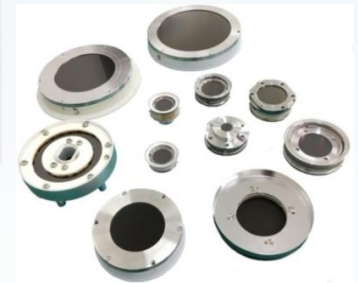
**01** **Component**

- ◆ Microchannel plates(MCPs)
- ◆ Optical fiber panels
- ◆ ...



**02** **Sensor**

- ◆ PMTs
- ◆ MCP detector
- ◆ ...



**03** **Device**

- ◆ UV cameras
- ◆ PMT assemblies and modules
- ◆ ...





1

### Microchannel plate PMT

Adopting two microchannel plates as the electron multiplication system, it has the characteristics of high time resolution, fast response, and compact product structure.

2

### Dynode PMT

According to the direction of incident light, which can be divided into end window PMT and side window PMT. It has the characteristics of good stability, wide spectral response range, and rich product types.

3

### PMT assembly and module

It is an integrated product based on PMT, high-voltage power supply and voltage divider. It has the characteristics of fast time response, stable performance, high sensitivity, wide photon linear response range, user-friendly, etc.

- From large area to small size
- From MCP type to Dynode type
- From bare PMT to PMT module



**Large area MCP-PMT**



- ◆ The first large area MCP-PMT is 20-inch, which was developed and produced from 2011.
- ◆ With the market demand, we began to develop and produce 8-inch MCP-PMT product.

N6203

20-inch MCP-PMT

N6082

8-inch MCP-PMT

N6201

20-inch MCP-PMT



**Small size MCP-PMT**

Based on the research foundation of large-area MCP-PMT, small-size MCP-PMT have been developed successively.

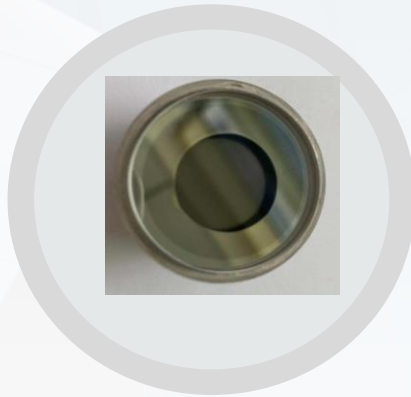
N6011



N6012



N6013



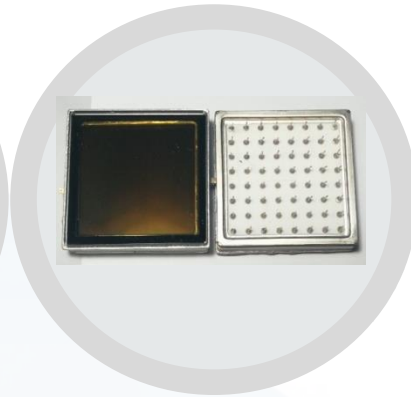
N6014



N6015



N6021



- Size: 1-inch, 2-inch
- Anode type: single anode, multi-anode
- Photocathode type: ultraviolet, bialkali, multialkali



### Dynode PMT

The development and production of the dynode-type PMTs began in 2018, and there are currently 14 kinds of products.

N2031  
(3-inch)



N1012



N1013



N2014



N2013



N4021



N2041



- Size: 0.5-inch, 1-inch, 2-inch, 3-inch, 4-inch
- Working type: end window, side window
- Anode type: single anode
- Photocathode type: ultraviolet, bialkali, multialkali, high-temperature bialkali





**PMT assembly and module**

The development and production of PMT assembly and module began in 2020, and there are currently 18 kinds of products.

M1011



Photon counter

M2011



Light detector

M3013



$\beta$  detector

M2111



Counting unit

M4011



D701A-14



High voltage socket

- Product type: photon counter, light detector,  $\beta$  detector, scintillator detector, counting unit, high voltage socket.

## PART 2 PMT Product series



### Production line

- MCP-PMT
- Dynode-PMT



### Productivity assurance

- Annual output of 10,000 MCP-PMTs.
- Annual output of 50,000 dynode-PMTs

## 03 Manufacturing capacity



## PART 3 PMT application

Due to its characteristics, PMTs have a wide range of applications, such as high energy physics, environmental monitoring, medical, radiation and other fields.



**High energy physics**



**Analytical instrument**



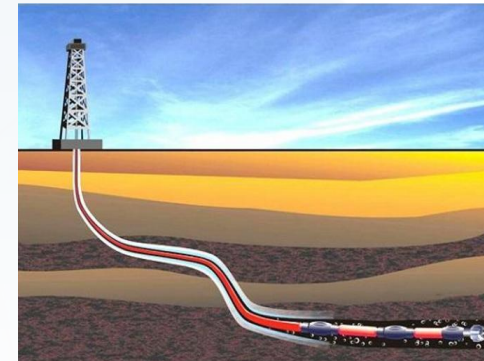
**Radiation measurement**



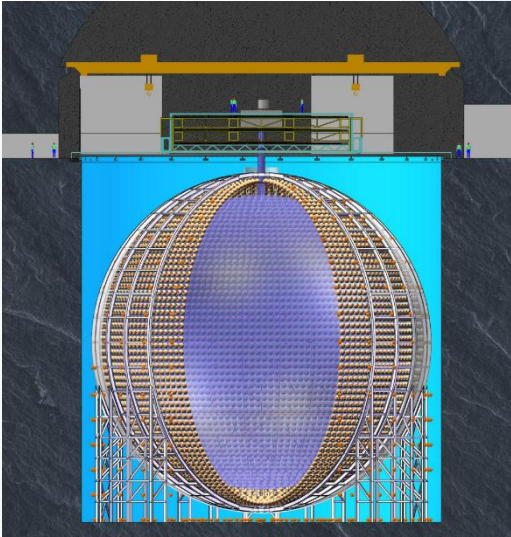
**Medical biology**



**Environmental monitoring**

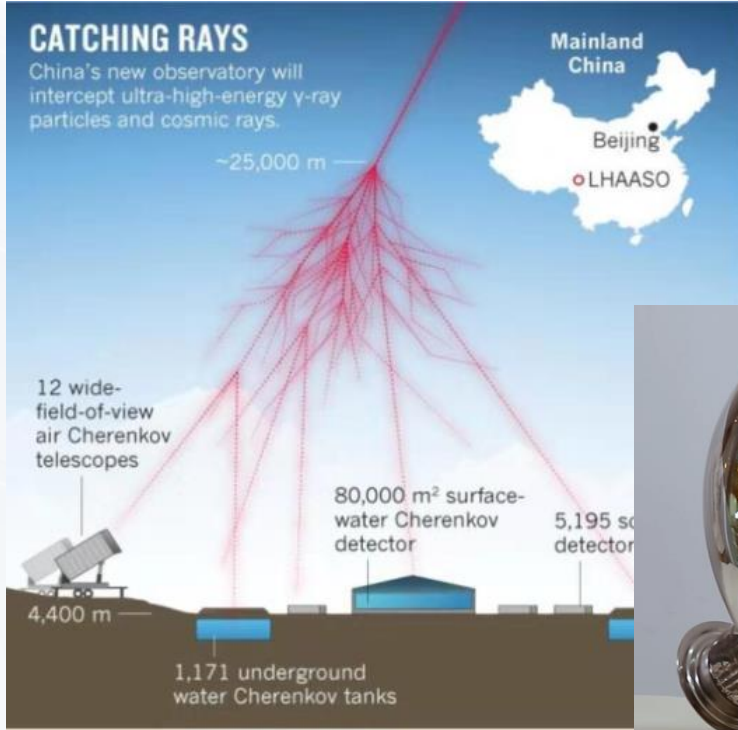


**Oil well logging**



CCTV News

- ◆ In 2011, IHEP began to cooperate with NVN to develop 20-inch MCP-PMT for JUNO project.
- ◆ In December 2015, NVN won the order of 15,000 pcs 20-inch MCP-PMTs from IHEP.
- ◆ In September 2020, NVN completed the delivery of 15,000 pcs 20-inch MCP-PMTs.
- ◆ In March 2022, the 20-inch MCP-PMT was broadcasted on CCTV News as a typical case.

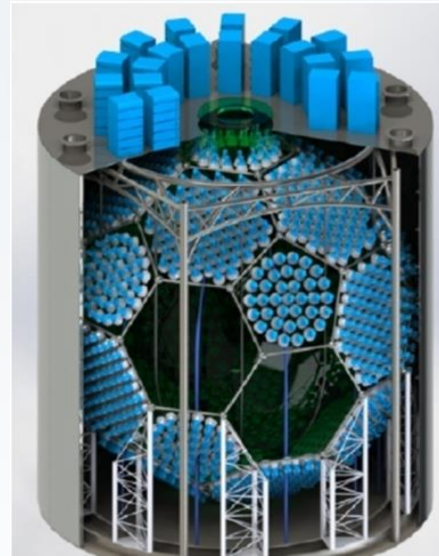
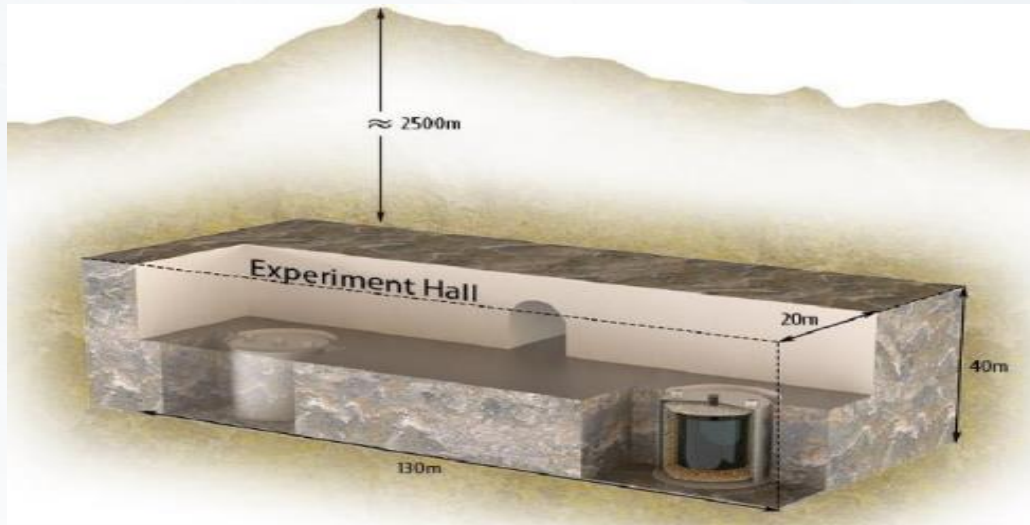


### New 20-inch MCP-PMT



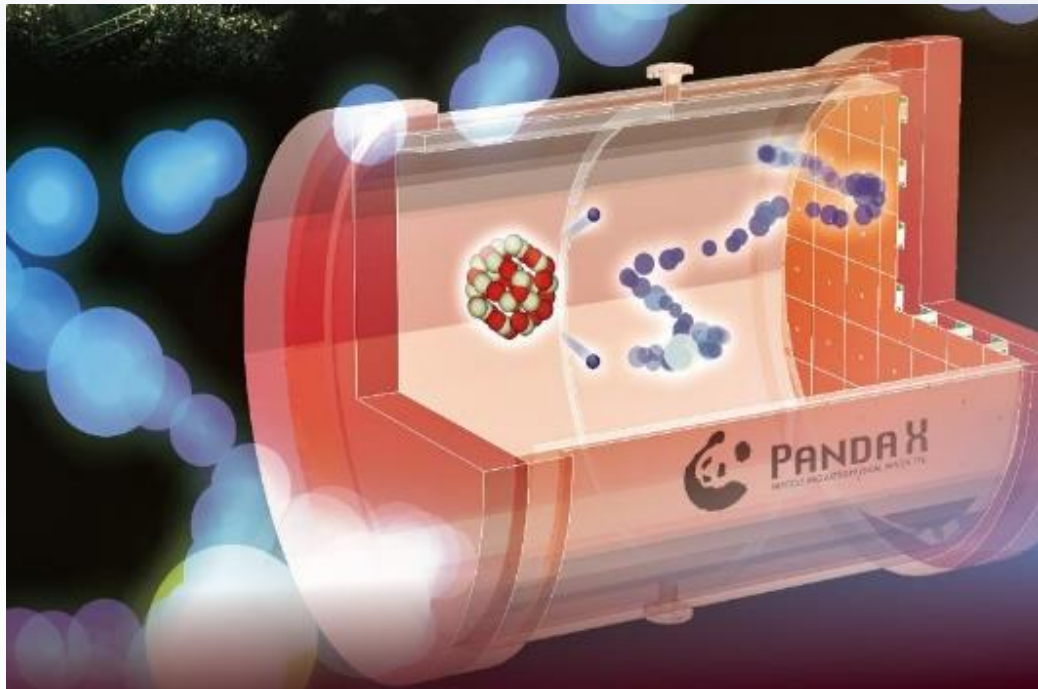
- ◆ In September 2018, NVN won the order of 2270 pcs 20-inch MCP-PMTs for the LHAASO project, which is a major national scientific and technological infrastructure project.
- ◆ In October 2019, NVN completed the delivery of PMTs for LHAASO project two months ahead of schedule.

- ◆ In December 2019, NVN won the first order of 8-inch MCP-PMT for the "Jinping Neutrino Experiment" project of Tsinghua University.
- ◆ In 2022s, NVN finished the delivery of this order.



## 8-inch MCP-PMT (PandaX)

- ◆ The PandaX liquid xenon detection experiment led by Shanghai Jiaotong University is located in the world's deepest underground laboratory in Jinping Mountain, Sichuan Province.
- ◆ In January 2023, NVN got the order of 250 pcs 8-inch MCP-PMTs which will be used for the peripheral anti coincidence detector of PandaX project.



Thank you for watching!

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