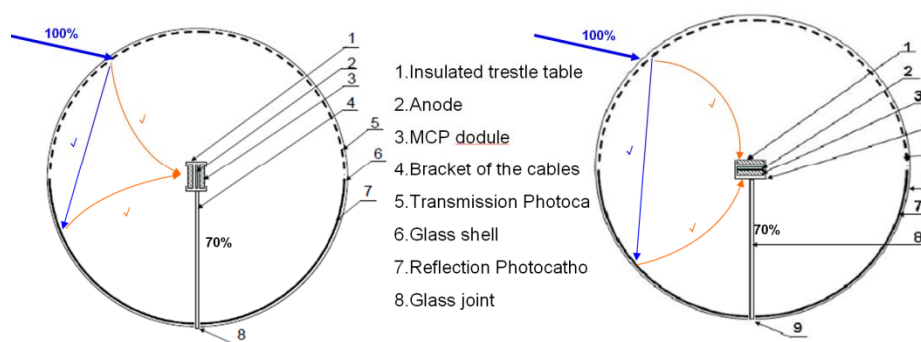




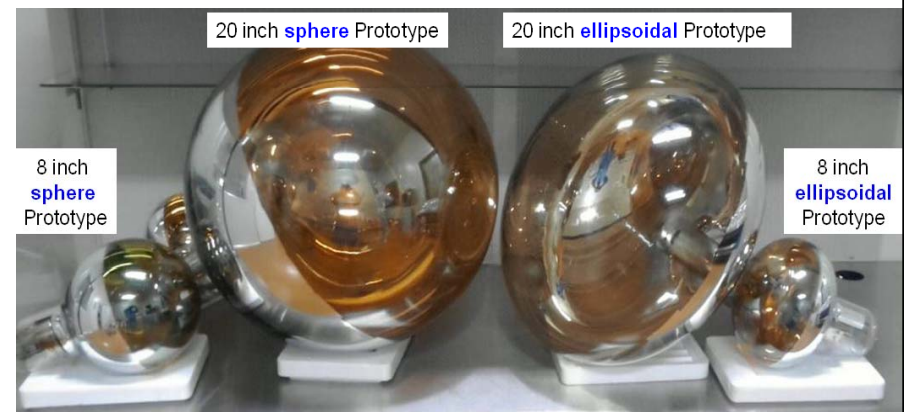
The R&D of Large Area MCP-PMT in IHEP

The researchers (Microchannel-Plate-Based Large Area Photomultiplier Collaboration (**MLAPC**)) in IHEP designed a new type of MCP-PMT for **JUNO** (Jiangmen Underground Neutrino Observatory)



The small MCP unit instead of the large Dynode, the transmission and reflection photocathode were assembled in the same glass shell to form nearly 4π photocathode effective area to enhance the efficiency of the photoelectron detecting.

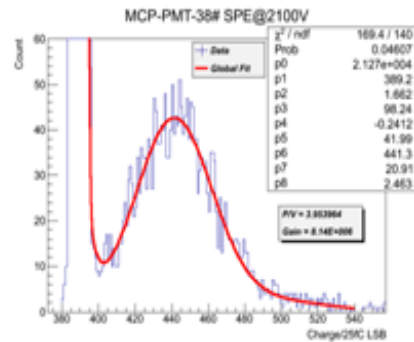
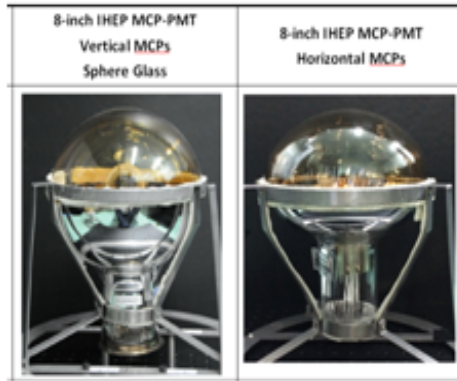
- MCP-PMT prototype technical issues mostly resolved;
- Successful 8" and 20" prototypes with normal performance;
- Three types of 8" prototypes;
- QE ~ 25% @ 410nm; CE ~ 60%; P/V of SPE > 2.0;
- Two types of 20" prototypes;
- QE ~ 22% @ 410nm; CE ~ 60%; P/V of SPE > 2.0;
- The better performance Prototype should be produced!;
- QE ~ 35% @ 410nm; CE ~ 80%;



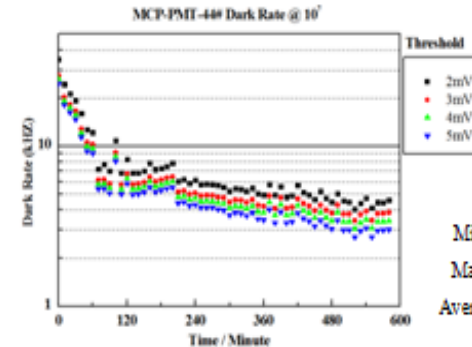


The R&D of Large Area MCP-PMT in IHEP

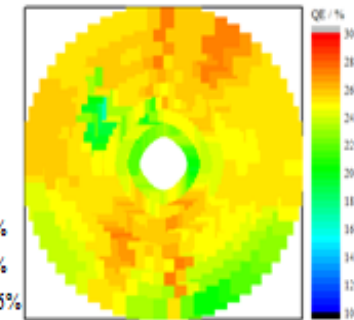
The 8 inch Prototypes



Single photo-electron spectrum



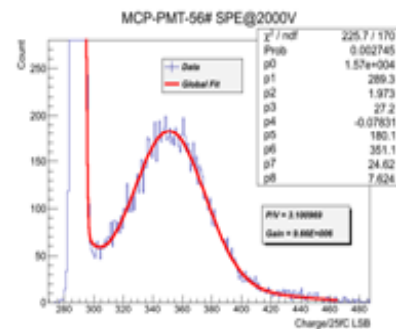
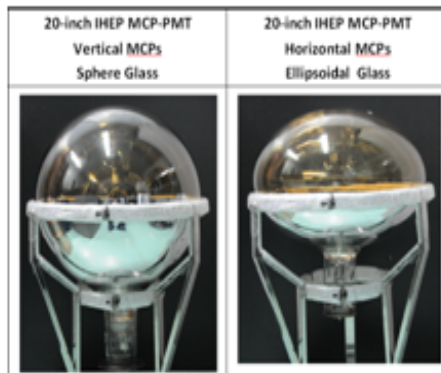
The dark count



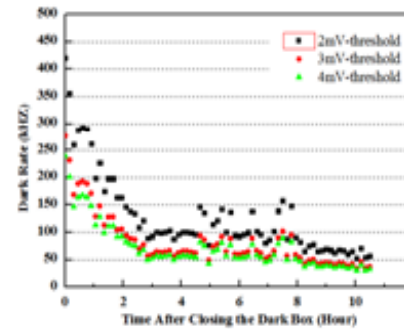
The Photocathode Uniformity

	HV	Gain	QE@410nm	P/V	Rise Time	Fall Time	Dark rate @1E7 (0.25PE)
8"-56#	2100V	~1E7	25%	~4	~1.3ns	~8.8ns	~3kHz

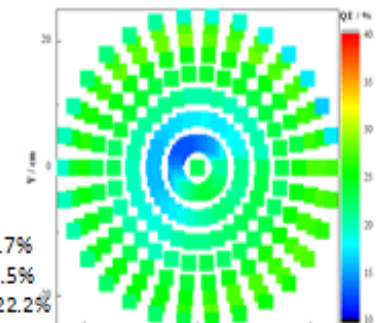
The 20 inch Prototypes



Single photo-electron spectrum



The dark count



The Photocathode Uniformity

	HV	Gain	QE@410nm	P/V	Rise Time	Fall Time	Dark rate @1E7 (0.25PE)
20"-51#	2000V	~1E7	22%	~3	~1.2ns	~15ns	~50kHz