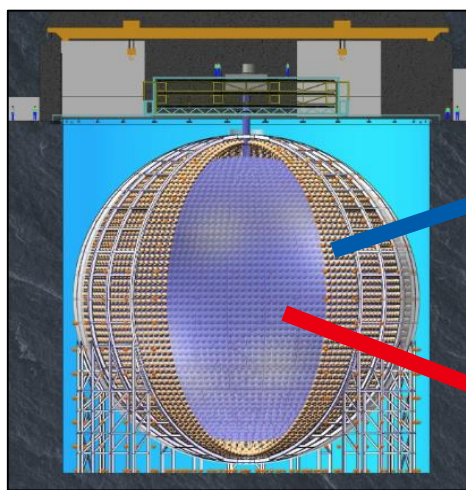




The PMT Mass Testing Systems for JUNO

Dr. Björn Wonsak (Univ. Hamburg), Alexander Tietzsch (Univ. Tübingen)

on behalf of the JUNO PMT Instrumentation Group



20000 20" PMTs



Quality
check

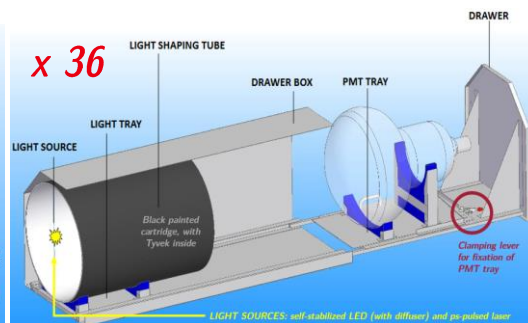
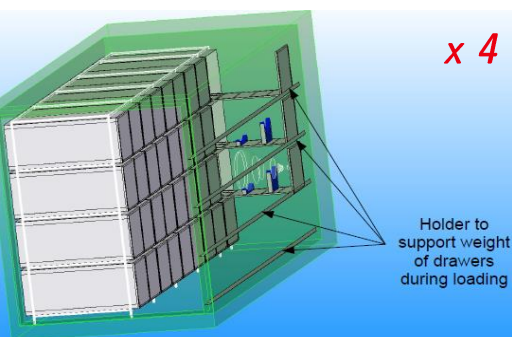
15k by NNVT (MCP)
5k by Hamamatsu (dynode)

$$3\%/\sqrt{E_{vis}}$$

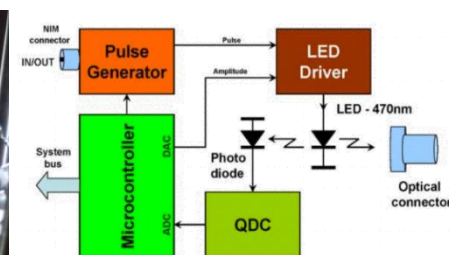
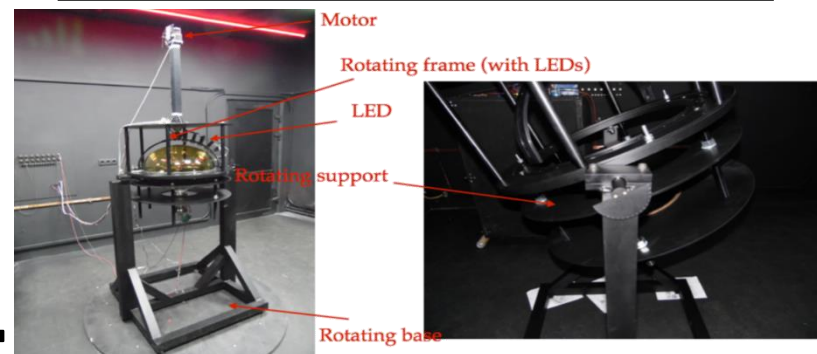
- ✓ Detection efficiency @420nm
- ✓ TTS of Single Photon Events
- ✓ Rise Time / Fall Time
- ✓ HV to reach gain of 10^7
- ✓ Dark Count Rate
- ✓ P/V Ratio
- ✓ Pre- and After-pulse Ratio
- ✓ High Uniformity of PDE

Detailed test of all PMTs

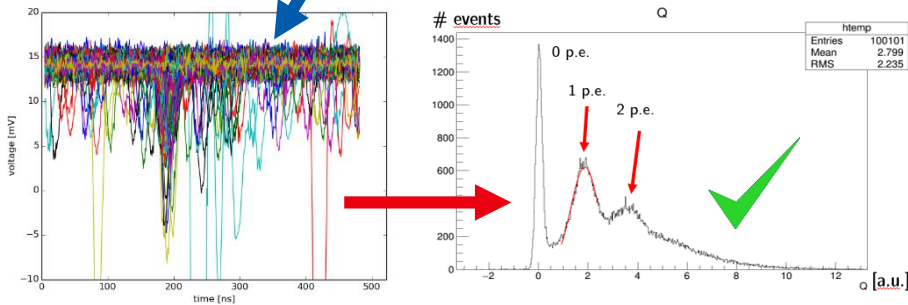
PMT MASS TESTING CONTAINER SYSTEM



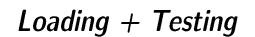
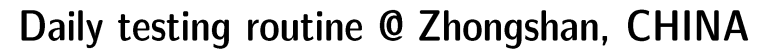
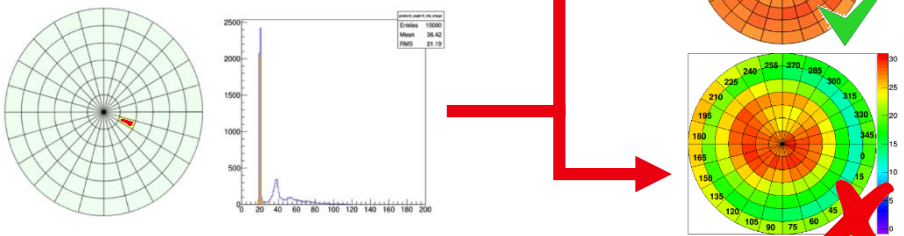
PHOTOCATHODE SCANNING STATION



- Commercial electronics used
- Fully automated data taking system



- Scan over whole photocathode
- 2D result map for PDE



Thank you for your attention!