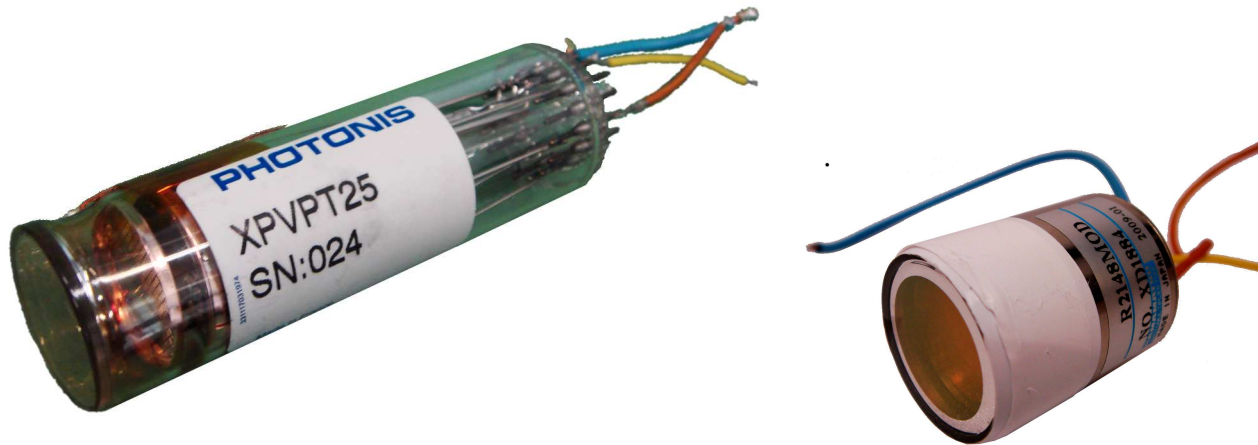


VPT News



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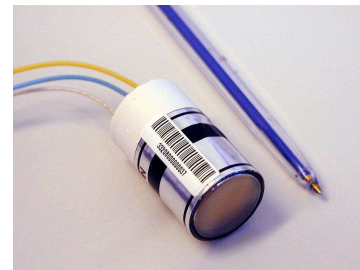
- **Photonis**

- ▷ promised high gain (40),
high quantum efficiency (50%)
- ▷ closed electron tube division
early this year!



- **RIE**

- ▷ manufacturer of CMS VPTs
- ▷ development of Tetrodes
for PANDA (gain of 20...30)

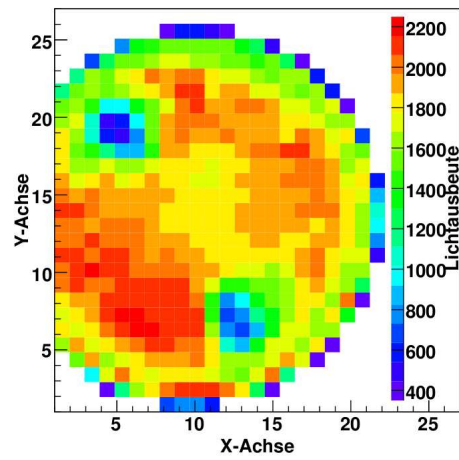


- **Hamamatsu**

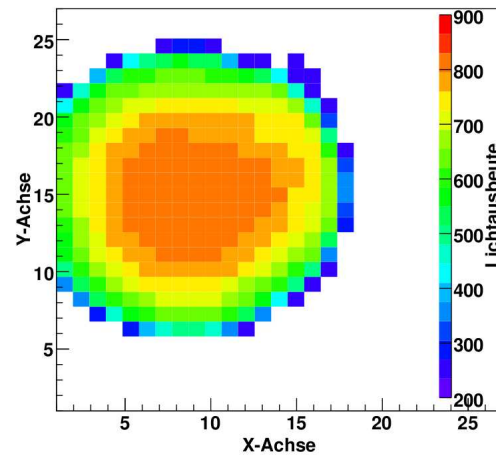
- ▷ first 'PANDA sized' tubes
- ▷ metal case prototypes
- ▷ gain < 10



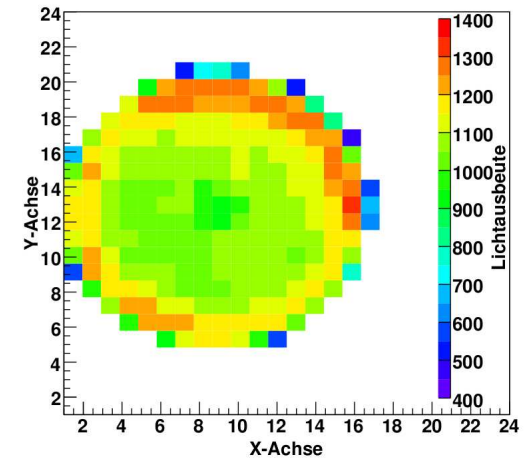
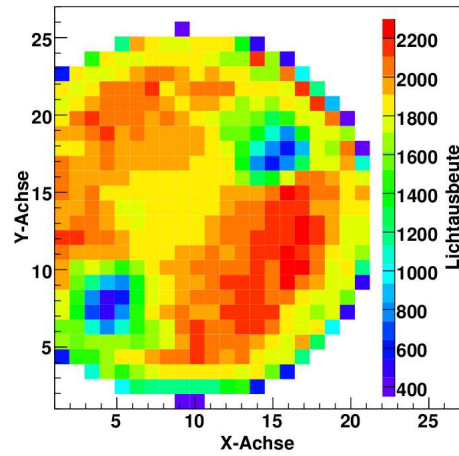
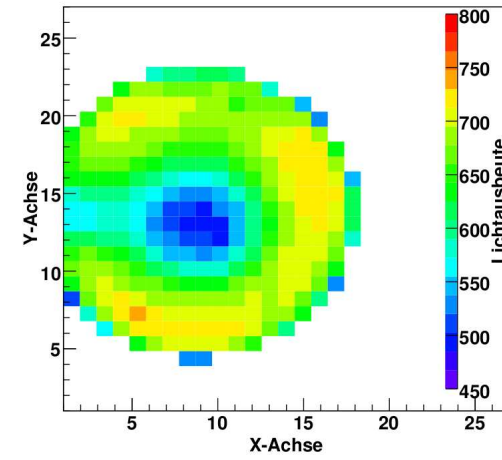
Photonis



RIE



Hamamatsu



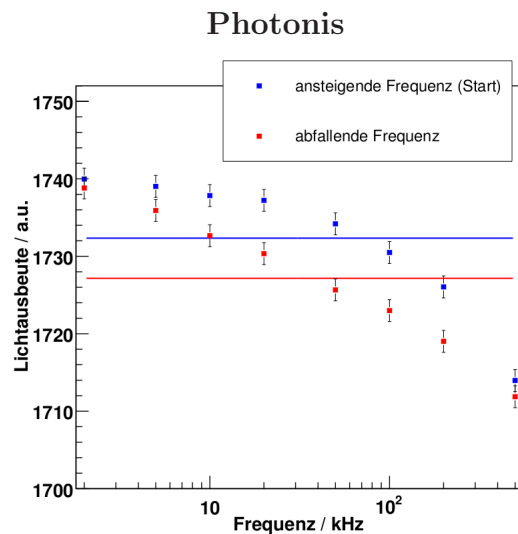
| | RIE | XPVPT25 SN31 | XPVPT25 SN24 | R2148MOD1 | R2148MOD |
|---------------------|---------|--------------|--------------|-----------|----------|
| HV | 1000 V | 1090 V | 733 V | 800 V | 750 V |
| G | 10 | 30 | 20 | 11 | 9,3 |
| QE | 22% | 20% | 20% | 19% | 32% |
| G · QE | 2.20 | 6.00 | 4.00 | 2.09 | 2.98 |
| \varnothing | 26.5 mm | 25.2 mm | 25.2 mm | 25.8 mm | 23.7 mm |
| \varnothing_{sen} | 19 mm | 25 mm | 25 mm | 19 mm | 16 mm |
| rel. width | 7.4% | 22.1% | 17.8% | 9.2% | 7.4% |
| E | 468 | 2190 | 1460 | 445 | 452 |
| Q | 75 aC | 351 aC | 234 aC | 71 aC | 72 aC |

E: Number of electrons per MeV at VPT anode

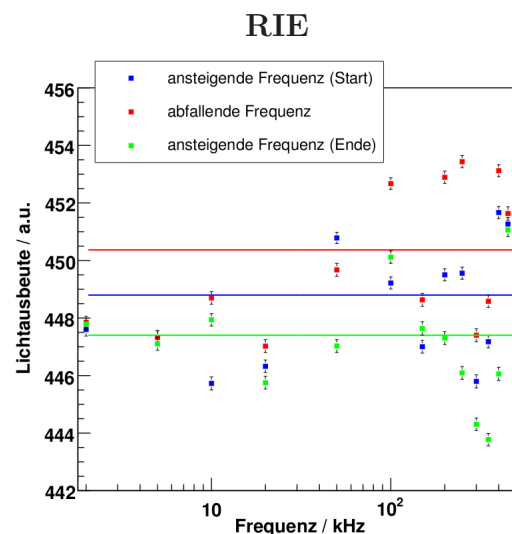
Q: Charge (E·e) per MeV at VPT anode

→ for PWO-II at -25°C, QE and G as stated by manufacturer!

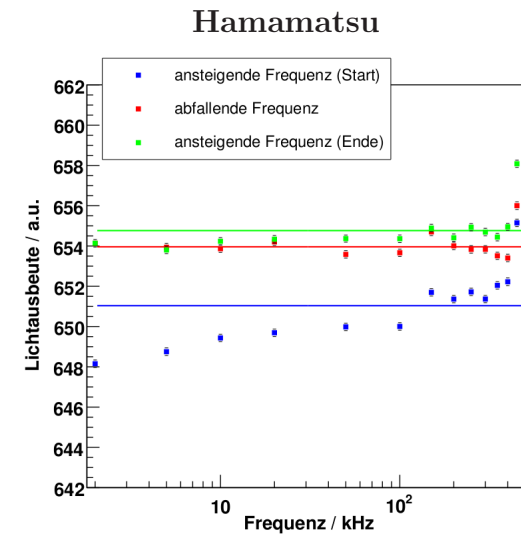
- 'Two pulser' method (to get rid of pulser walk):
 - ▷ Variable (high) frequency pulser (1...500 kHz)
 - ▷ Constant low frequency pulser (1 kHz), triggering ADC



Non-lin. 1.5 %, hysteresis!



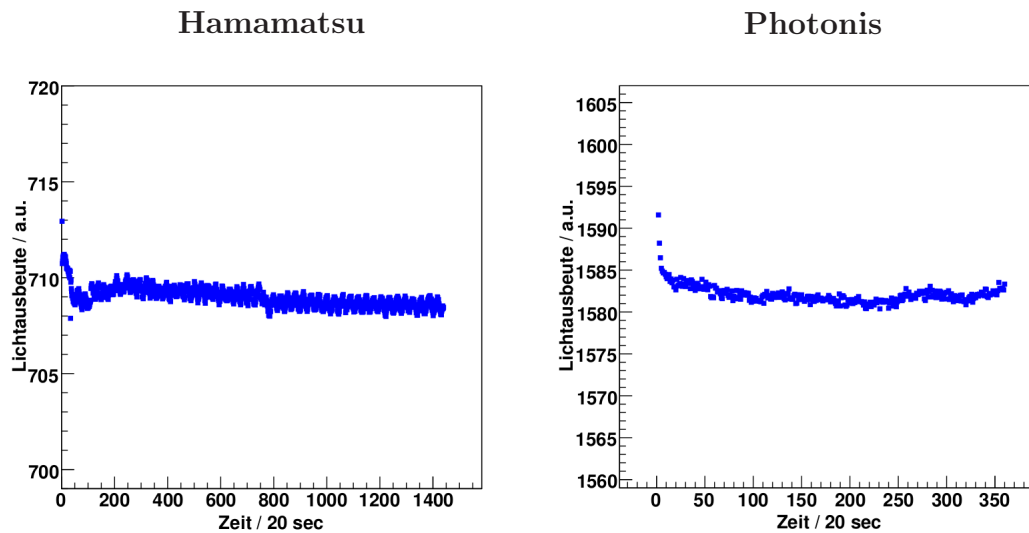
Non-lin. 2.0 %



Non-lin. 1.5 % (0.3 % w/o 'blue')

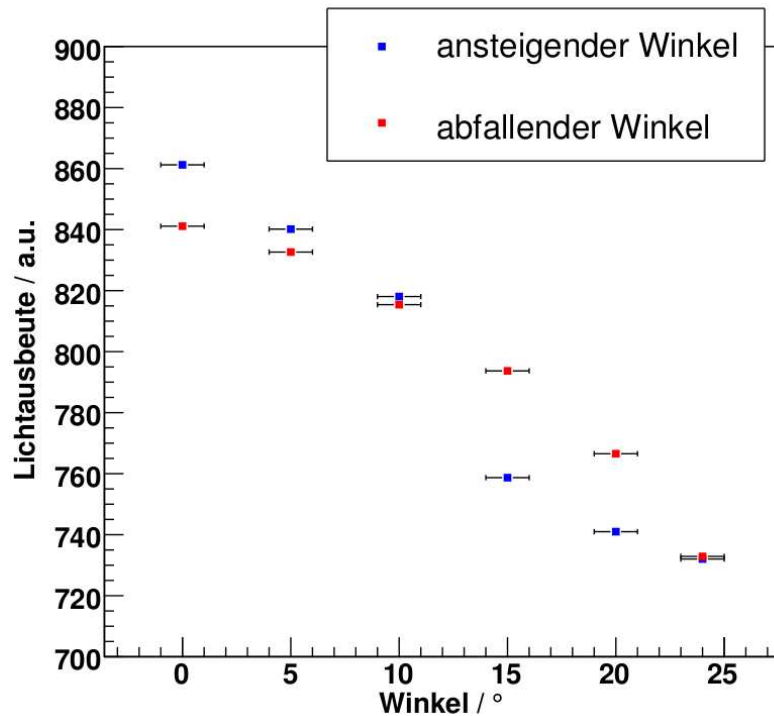
- Basel VPT preamp involved (and checked for linearity vs. frequency)
- Bandwidth limitation of measurement: main amp
 - ▷ DC coupled (funny/sophisticated Basel preamp baseline behaviour)
 - ▷ reasonable low shaping time

- Effect of (temporarily) 'burn in':
 - ▷ ~ 1 hour after HV supplied (each time!)
 - ▷ Equilibrium of evaporated and reabsorbed (alkali) atoms of dynode material (Hamamatsu)
- Long-term (8 hours) measurements:



- Non-linearity 0.14%

Hamamatsu R2148MOD ('PANDA sized' tube)



- Loss up to 15 %
- 0.2 T permanent magnet
- Maximum VPT angle in PANDA: 17°
- Maximum field at VPTs in PANDA: 1.3 T
- Set up for measurements in 1.5 T field under construction

Y. Yoshizawa, K. P. Aicher (Hamamatsu)

- Glass:
UV okay (Giessen measurements),
probably wrong quartz type delivered (Hamamatsu fault)
- Larger sensitive cathode area?
→ 16/23.7 vs. 25/25.2 (Photonis)
- Glass envelope instead of (magnetic) metal?
- Preferences for pin out?
→ Glass: pins at outer diameter
- Maximum supply voltage 1 kV
- Allowed preasure on VPT back?
→ spring loaded mounting

Please use the PANDA Forward Endcap forum:

<http://forum.gsi.de>

→ **PANDA**

→ **PANDA-Detector**

(Register: Fritz-Herbert Heinsius, Jan Schulze)

→ **Forward Endcap Forum**