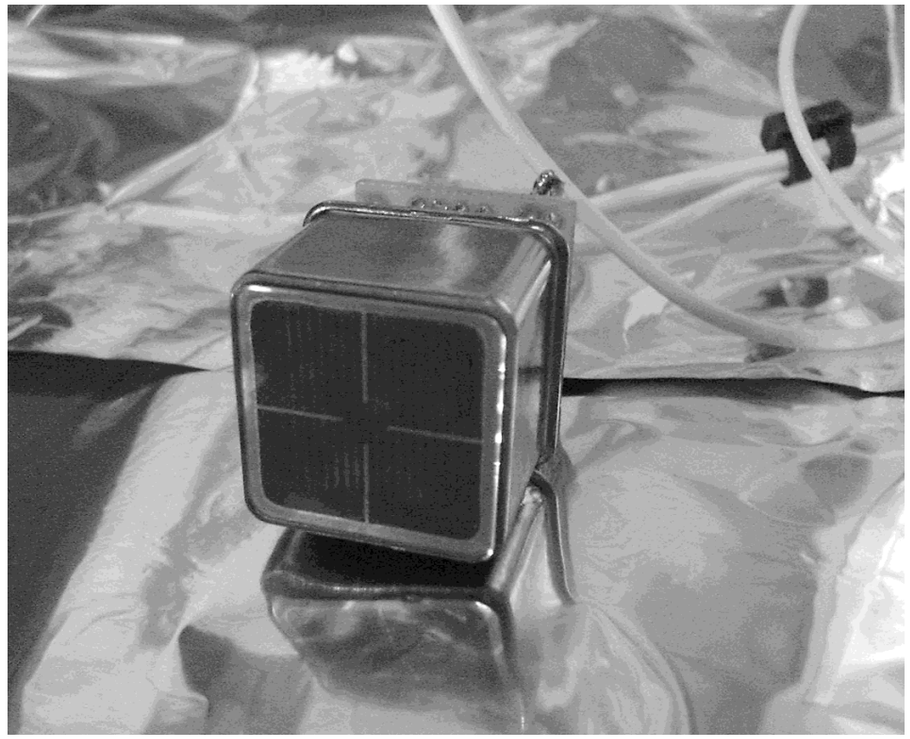
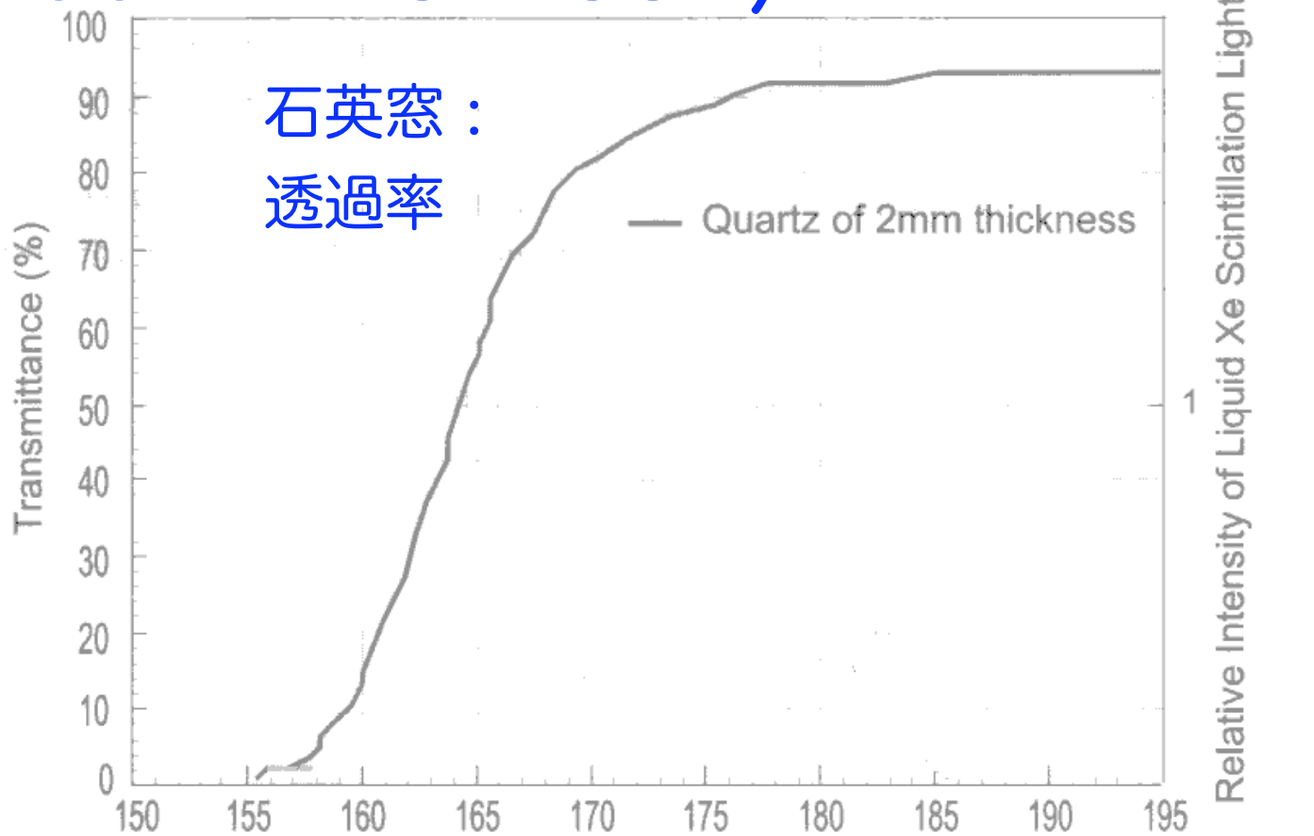
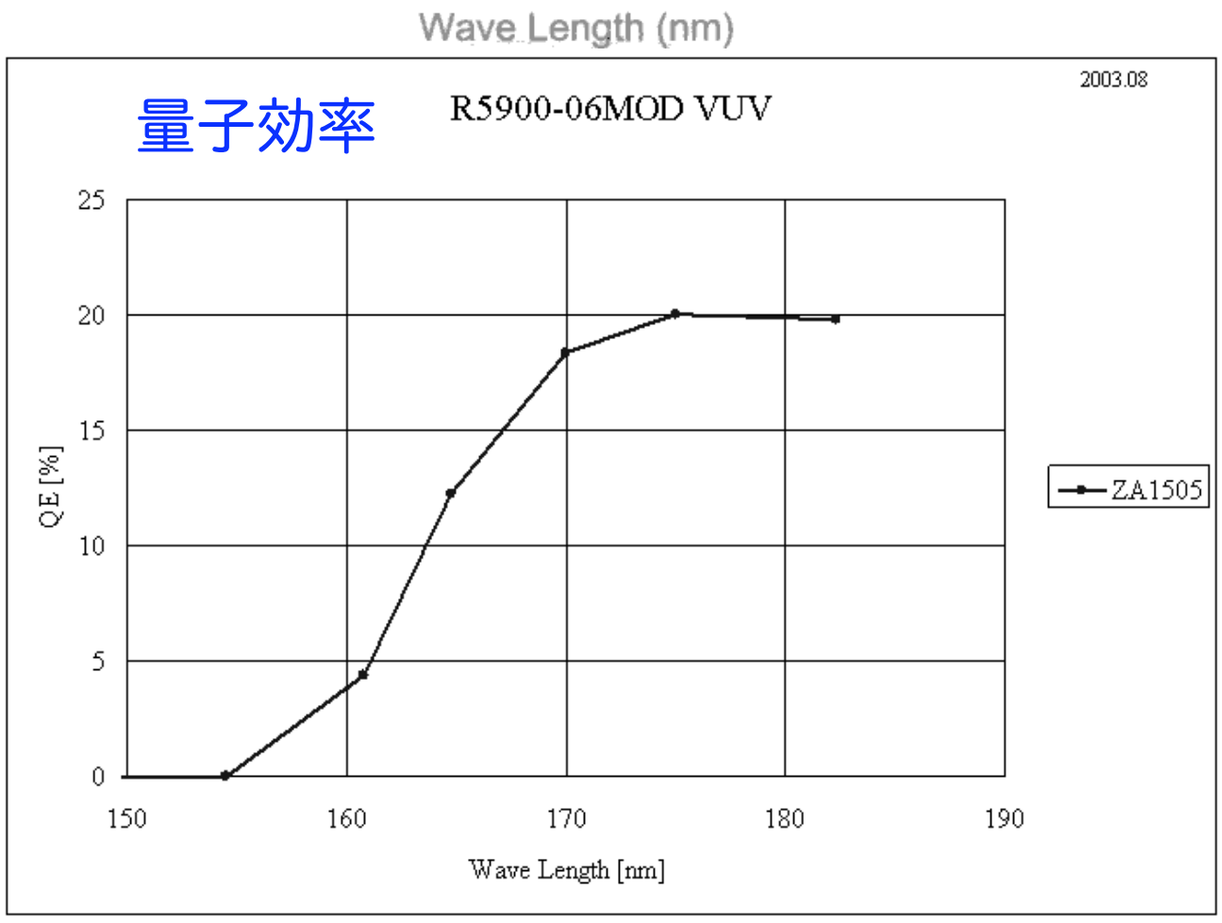
PMT (R5900-06AL12S-ASSY)

錦戸氏D論より

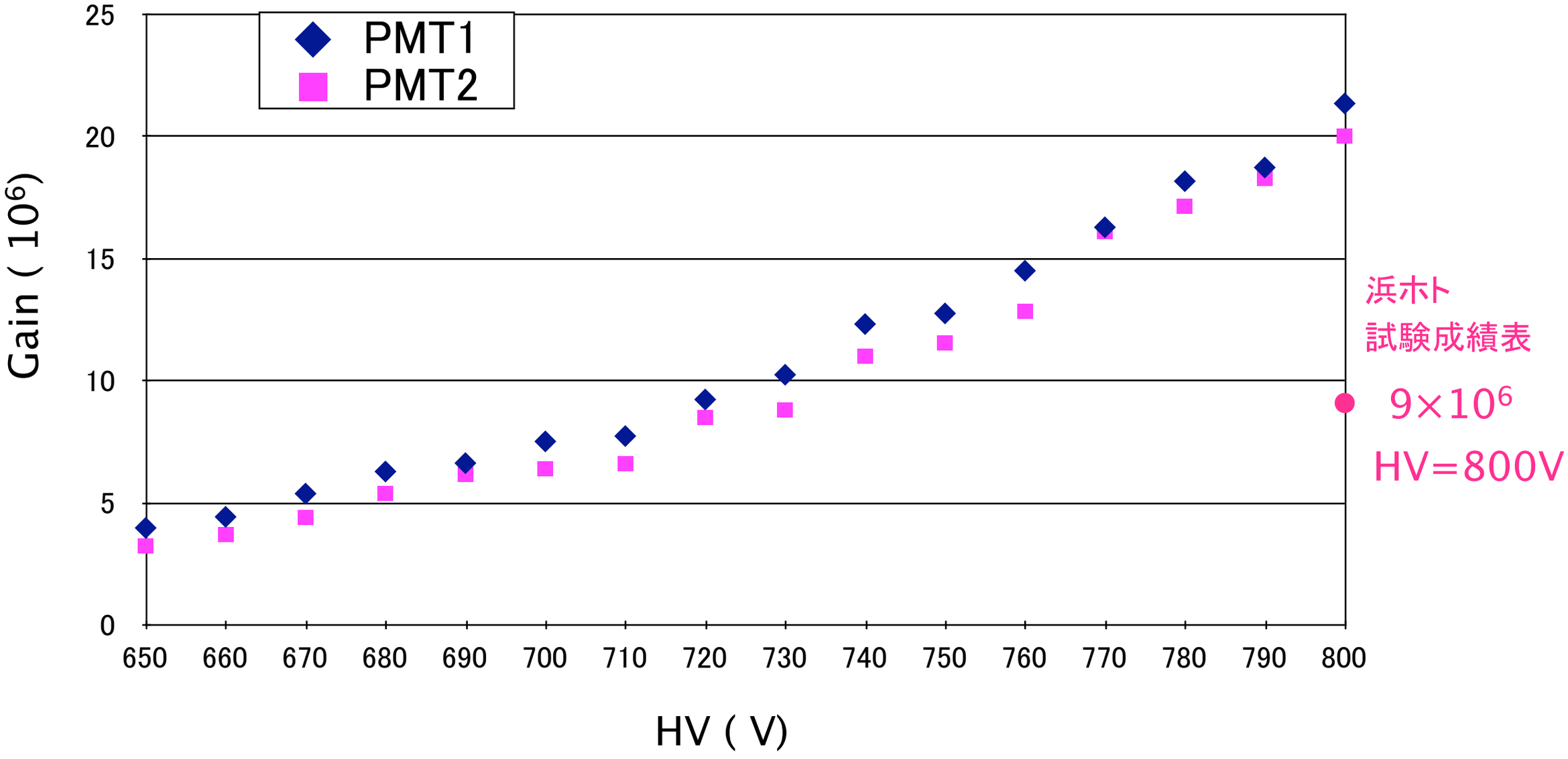




PMT size	26 × 26 mm^2
Photo-Cathode material	Rb–Cs–Sb
Size of e ective area	18 × 18 mm^2
Typical Q.E.	20 %
Dynode Type	Metal Channel
Number of stages	12
Typical H.V.	800V
Typical gain	1 x 10^7



PMT1,2 ゲインのHigh Voltage依存性



キセノン純化中の光量の推移

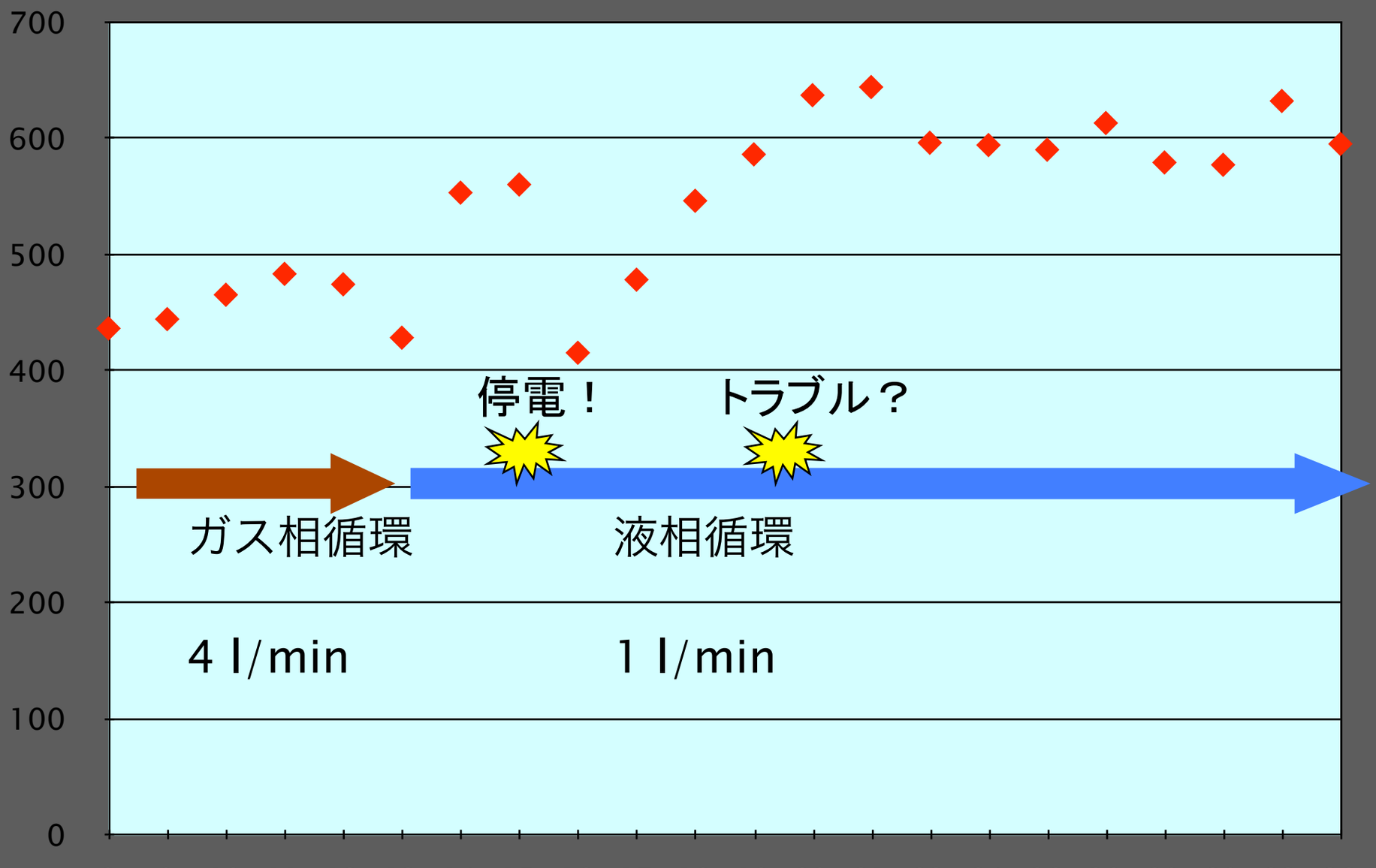
金子、学会発表、2009年3月29日

現在、PMTで測定される光は予想値近くでほぼ飽和

窓の透過率　　PMTのゲイン

$$Q = E / W \times \Omega/4\pi \times T \times Q.E. \times e \times G$$

$$\fallingdotseq 5.5\mathrm{MeV}/18\mathrm{eV} \times 1.0\times10^{-2} \times 0.8 \times 0.2 \times 1.6\times10^{-19}\mathrm{C} \times 3.5\times10^{6} = 2.7\times10^{-10}\ \mathrm{C}$$



→ 540 counts

光はほぼ100%検出器に入っていると考えられる。

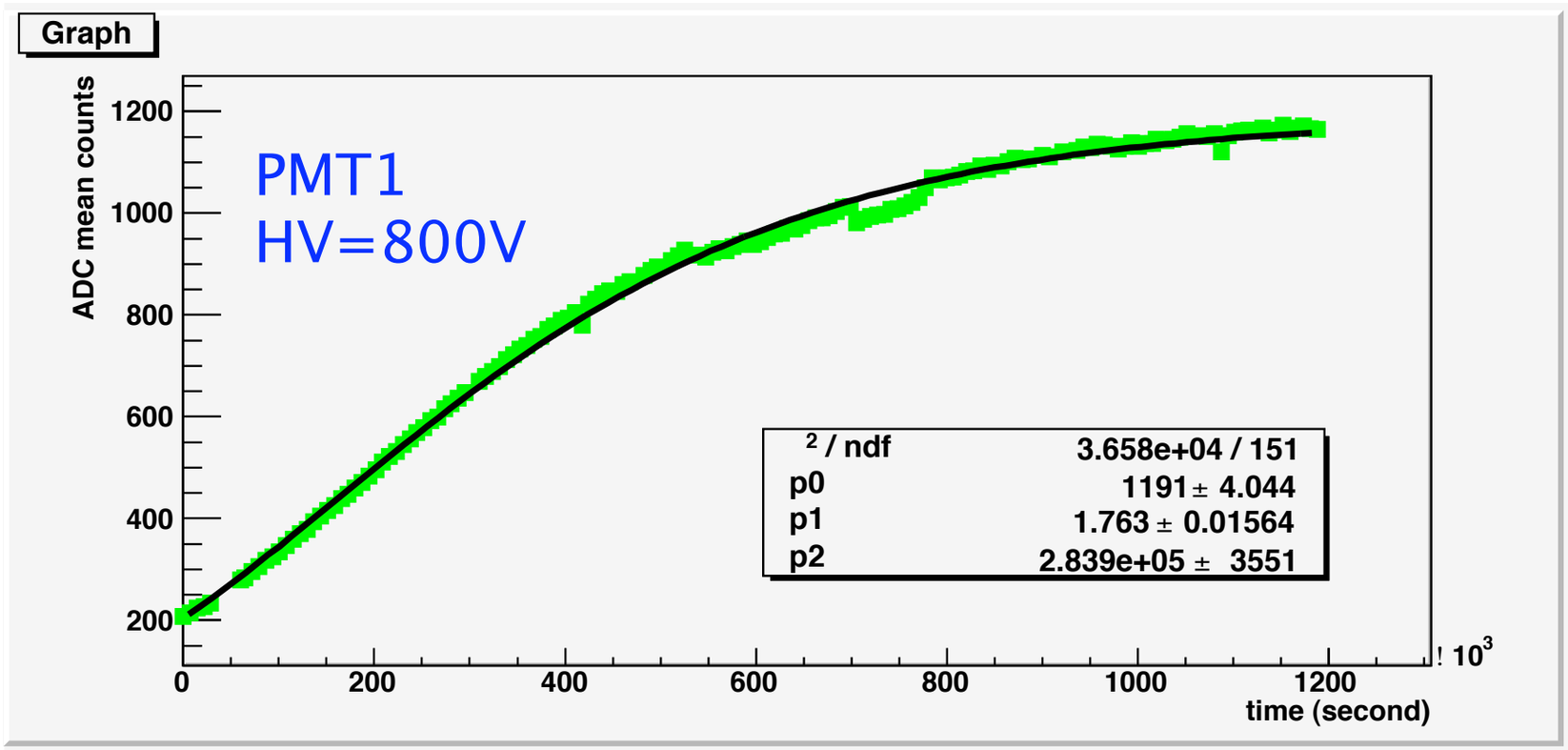
Ref. T. Doke et al., Jpn. J. Appl. Phys. 41 (2002) 1538

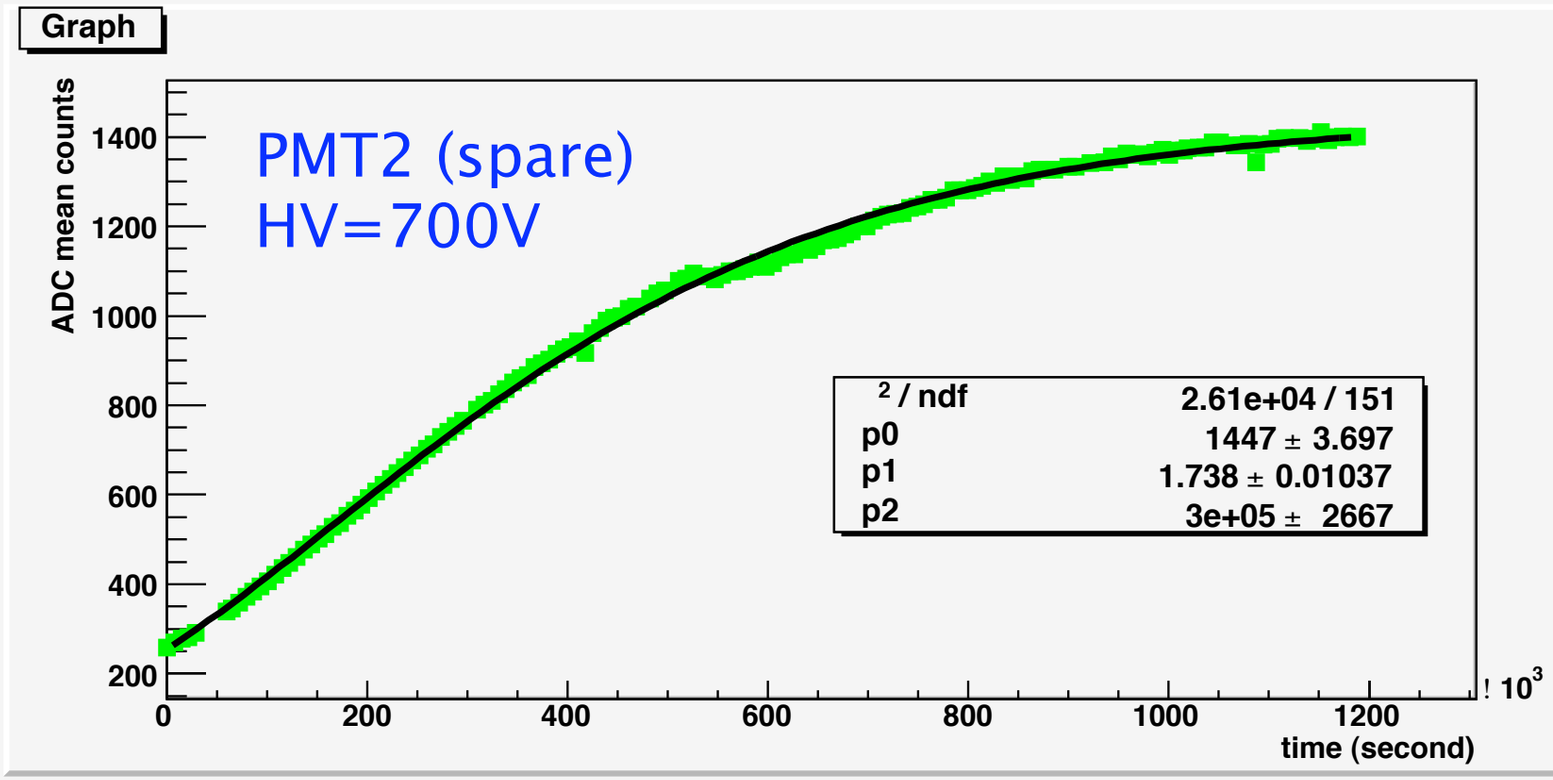
Table III. Most probable values of W_{ph}(max), η-factor, q-factor, η_0, α/β ratio, $W_{ph}(\alpha)$ and $W_{ph}(\beta)$ in liquid argon and in liquid xenon.

	Liq.Ar	Liq.Xe
$N_{ex}=N_i$	0.21	0.13
W_{ph}(max) (eV)	19:5 ± 1:0	13:8 ± 0:9
η	0:80 ± 0:04	0:64 ± 0:03
q	0:72 ± 0:04[a)]	0:77 ± 0:04[a)]
β/α	1:11 ± 0:05	0:81 Þ0:07 0:13
η_0	–0.75	0.1–0.5
$W_{ph}(\alpha)$	27.1	17.9 (16:3 ± 0:3[33)])
$W_{ph}(\beta)$	24.4	21.6

[a)]These values are obtained from scintillation yield curves as shown in Figs. 2 and 4. As a result, the value of 0:72 ± 0:04 for liquid argon is slightly di erent from the original one (q =0.71 [6)]), which was obtained from Fig. 3.

Purification process by scintillation lights





fitted by

$p(d,t) = p_0 e^{-d/\lambda}$

$\lambda = \lambda_0 e^{t/\tau}$

,where

λ_0 = initial attenuation length and τ = time constant of purification

$p_1 = d/\lambda_0 = 1.75$

$p_2 = \tau = 2.9 \times 10^5$ sec

τ = 3.4 days

put d = 5 cm

λ_0 = 2.9 cm

λ =160cm at 14days