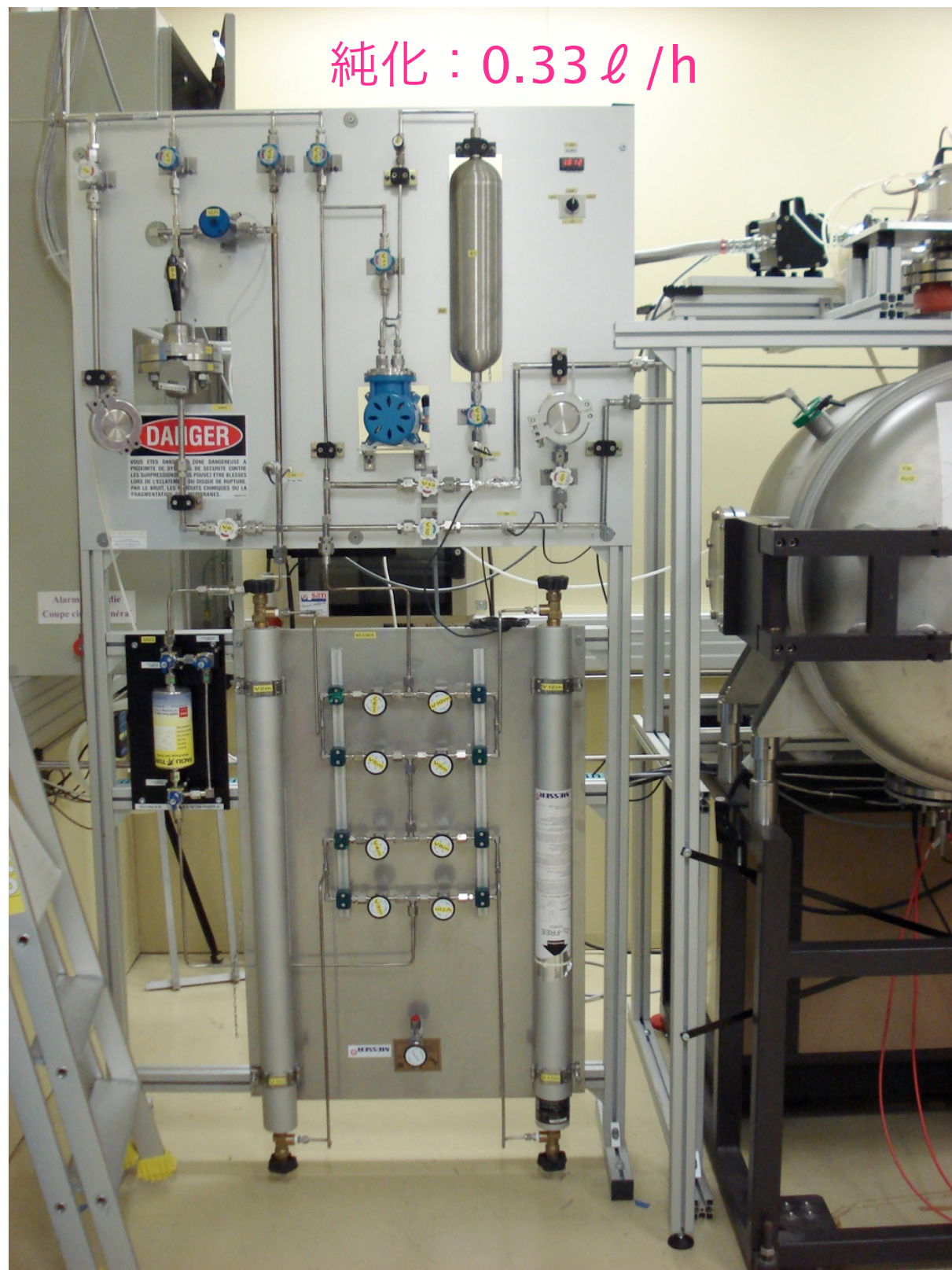


Subatech 液体キセノングループ

2008.6.16 Nantes 訪問, Dominique Thers氏グループと議論



LXe technology @ Subatech

■ Xenon liquefaction at low pressure < 2 bars (absolute)

- gas→liquid transition : about -110 °C

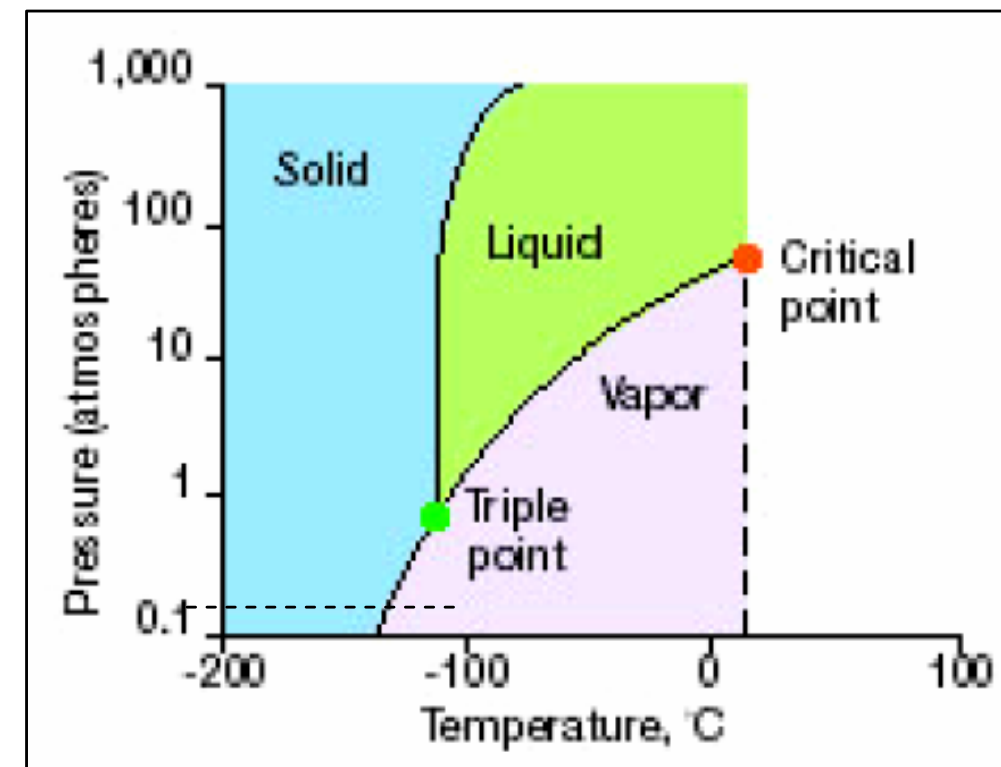
ex: $T_{\text{condensation}} = -108^{\circ}\text{C}$ and $T_{\text{freezing}} = -112^{\circ}\text{C}$ for $P = 1$ bar

- precise temperature regulation
- cold head : Pulse Tube Refrigerator (developed @ KEK by T. Haruyama)

■ Xenon purification

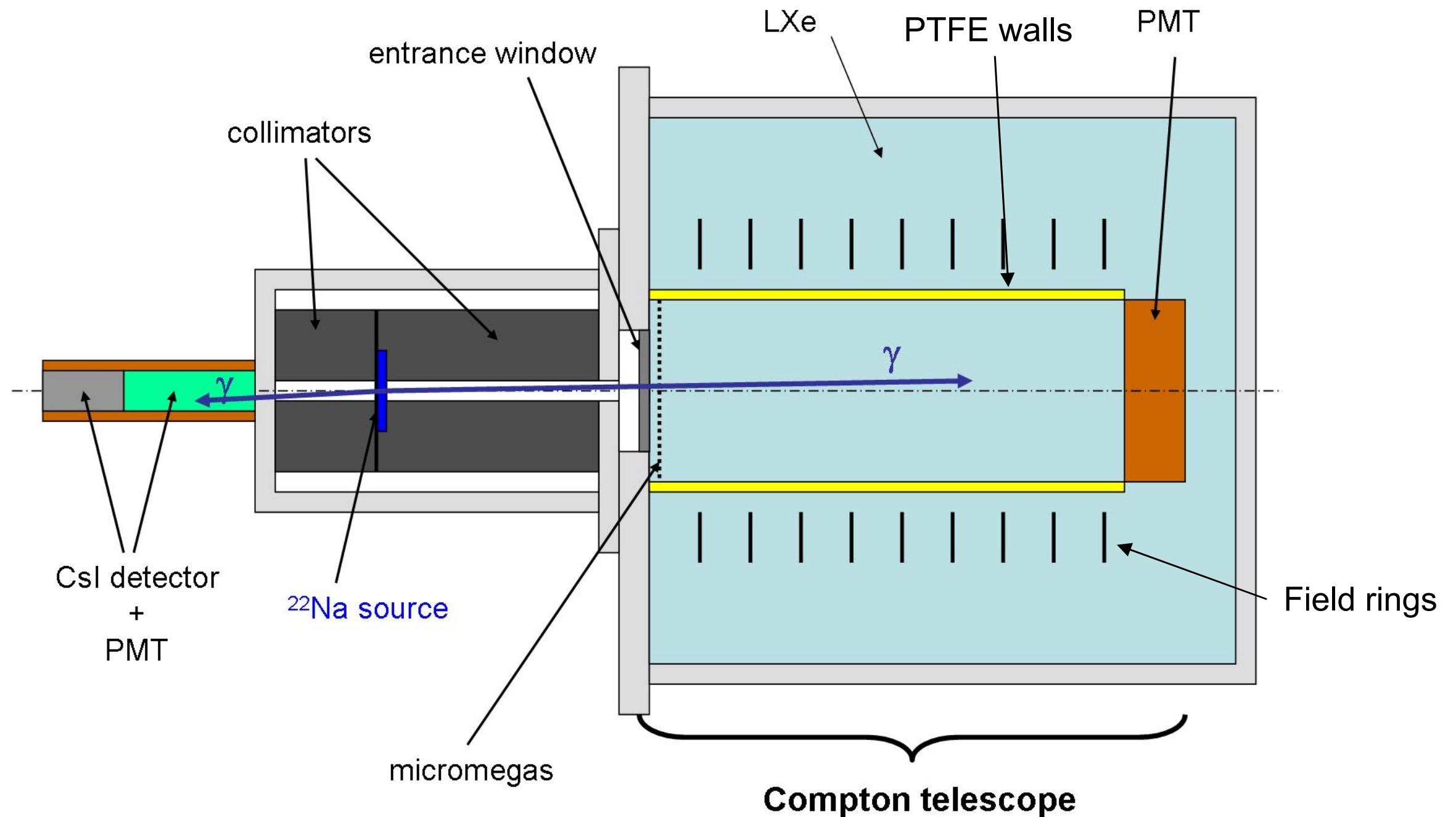
- LXe purity level ~ 1ppb ($\text{O}_2, \text{H}_2\text{O}, \dots$)
- gas purifiers
- gas circulation

Xenon phase diagram



Experimental setup

Tests with ^{22}Na source : measurement in coincidence of 511 keV photons



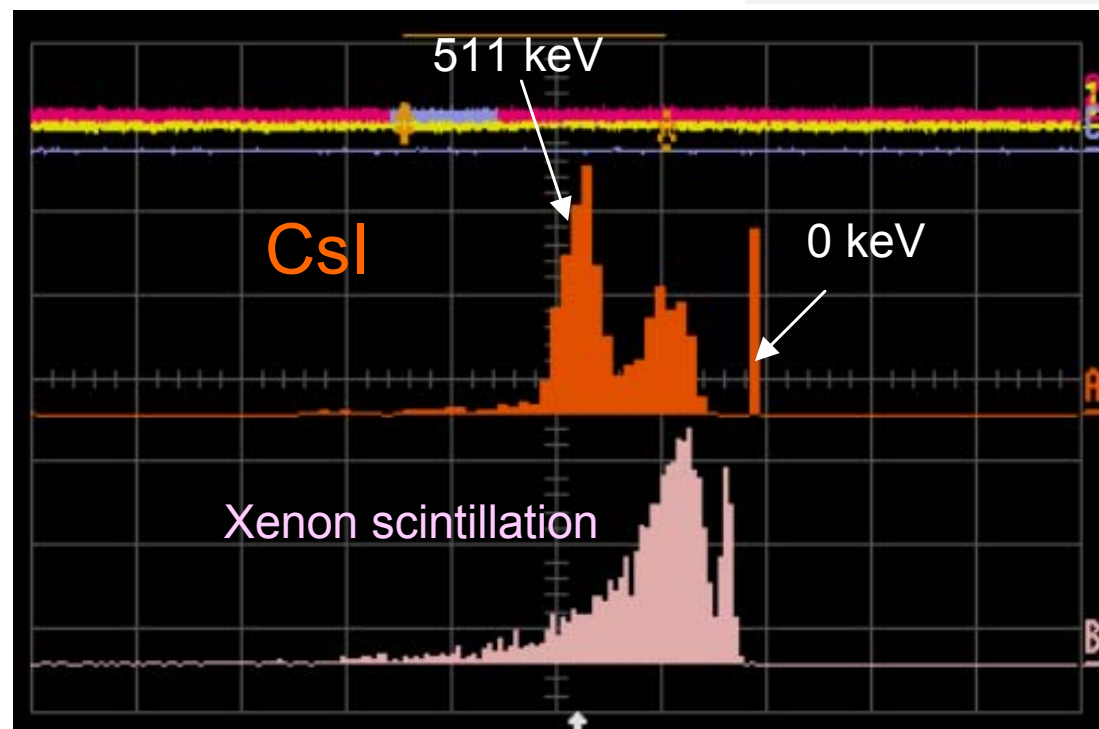
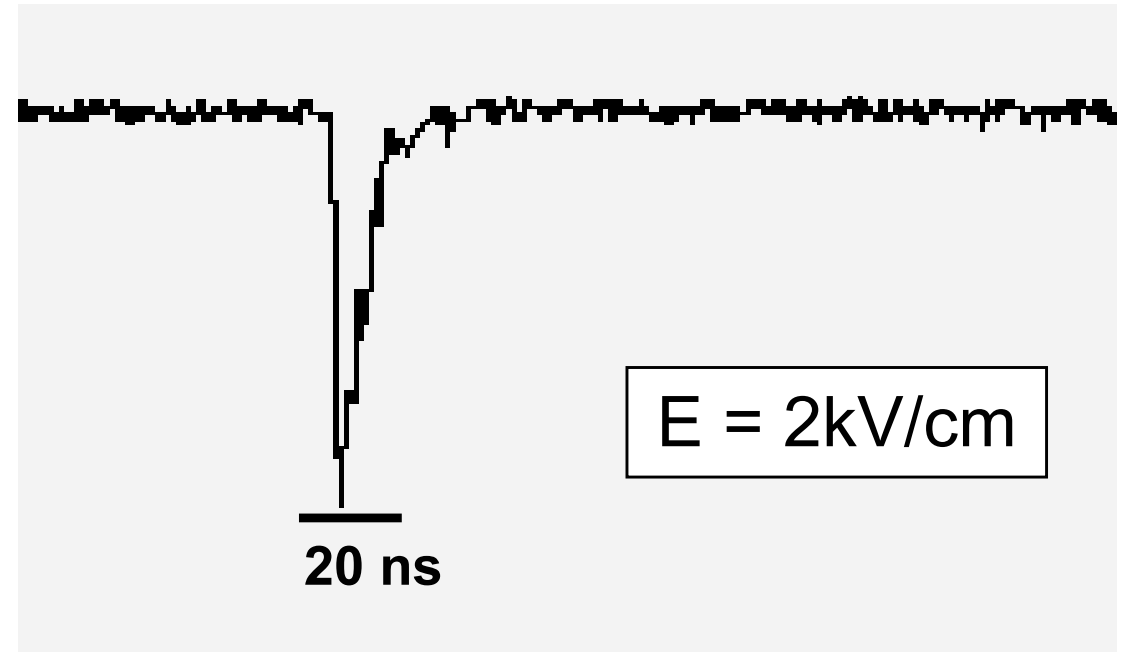
External trigger = CsI detector

Scintillation signal

Typical scintillation signal from PMT:



PMT Hamamatsu



Coincidence with Xenon PMT

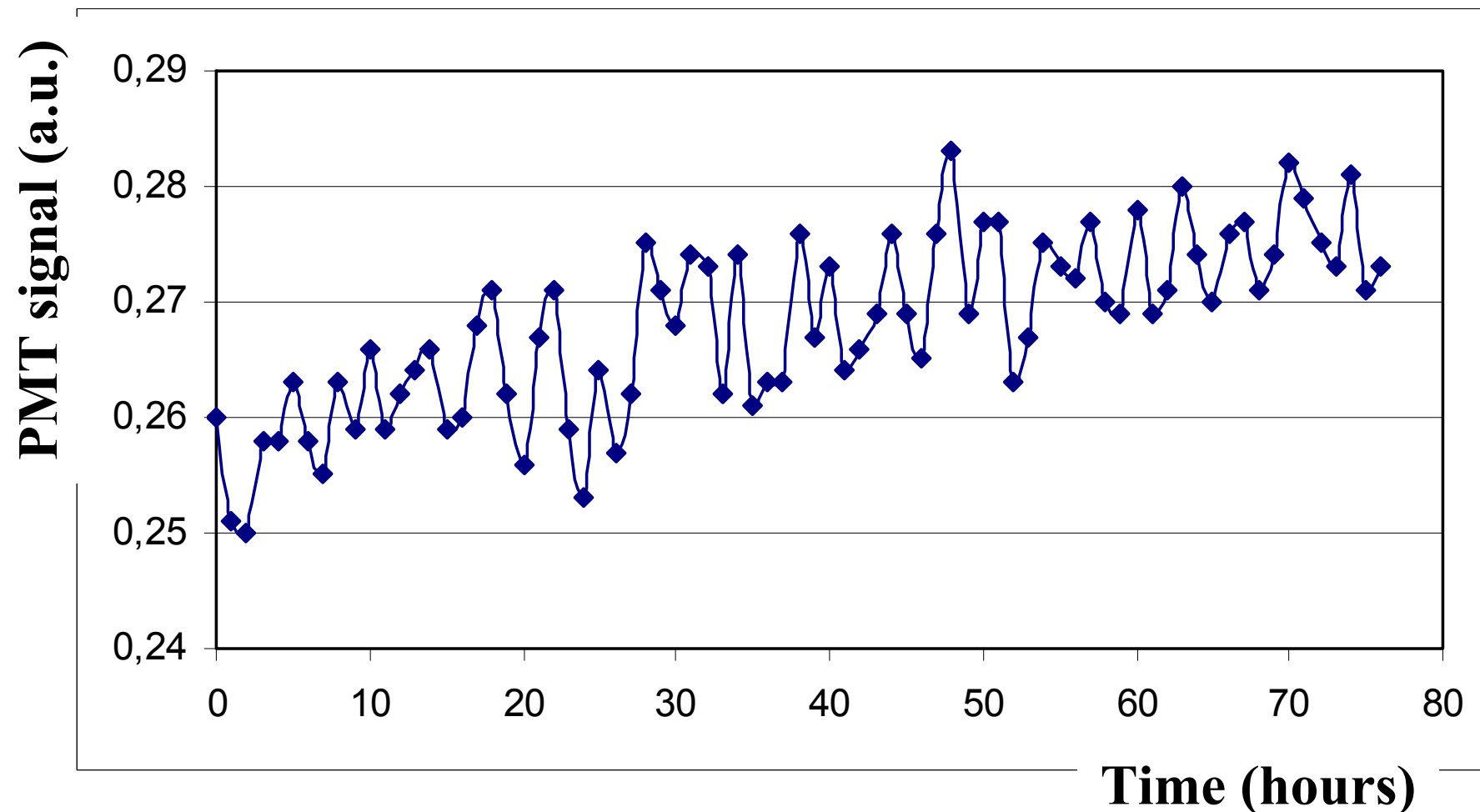


→ window on 511 keV (CsI)

⇒ Evidence of 511 keV γ detection in LXe

Xenon purification

Purification effect on scintillation signal :

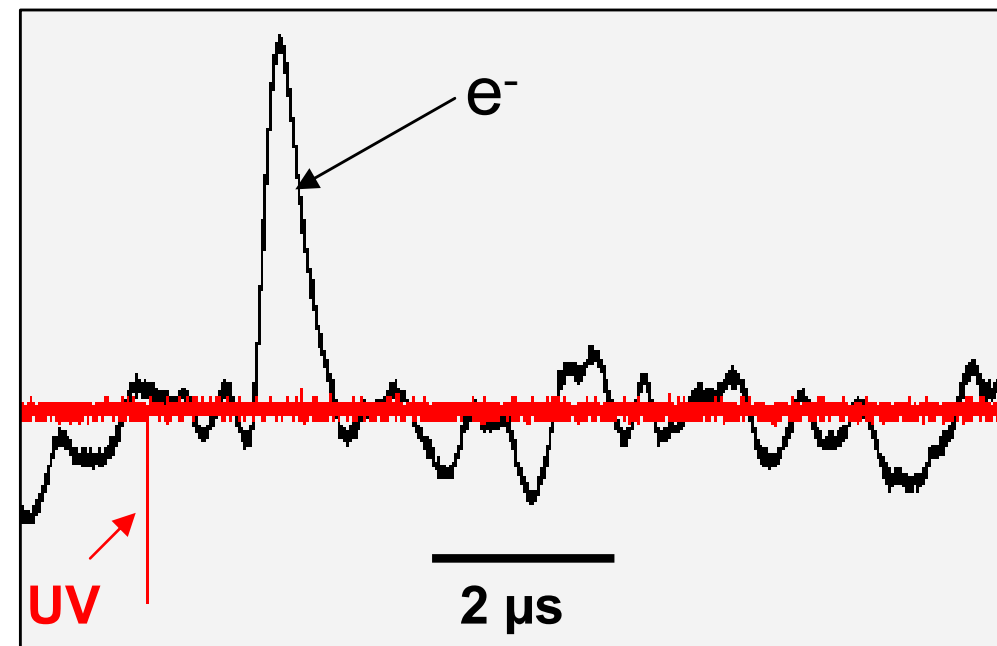
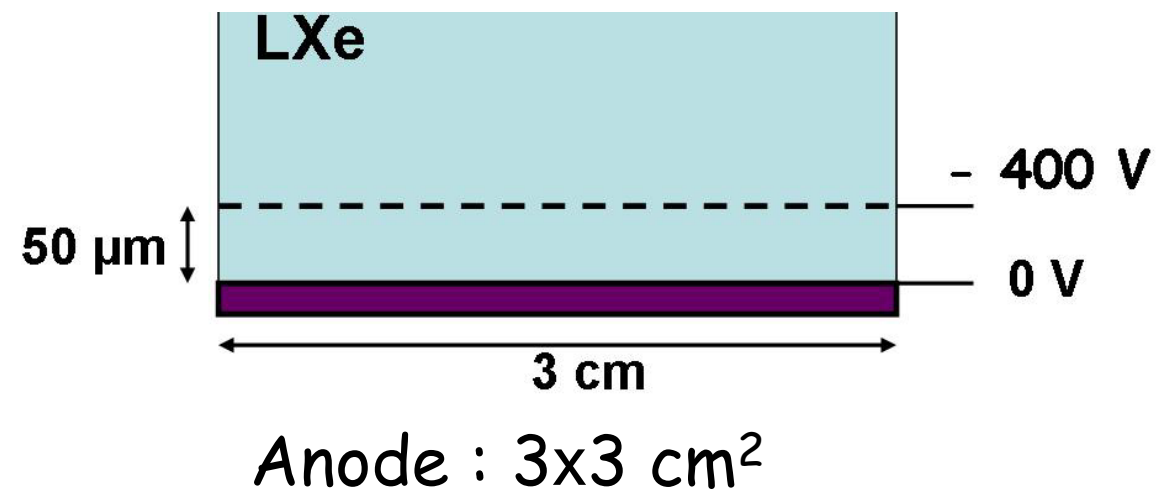


Continuous signal improvement on PMT : ~ 6% in 3 days (preliminary)

→ Similar tests with charge collection...

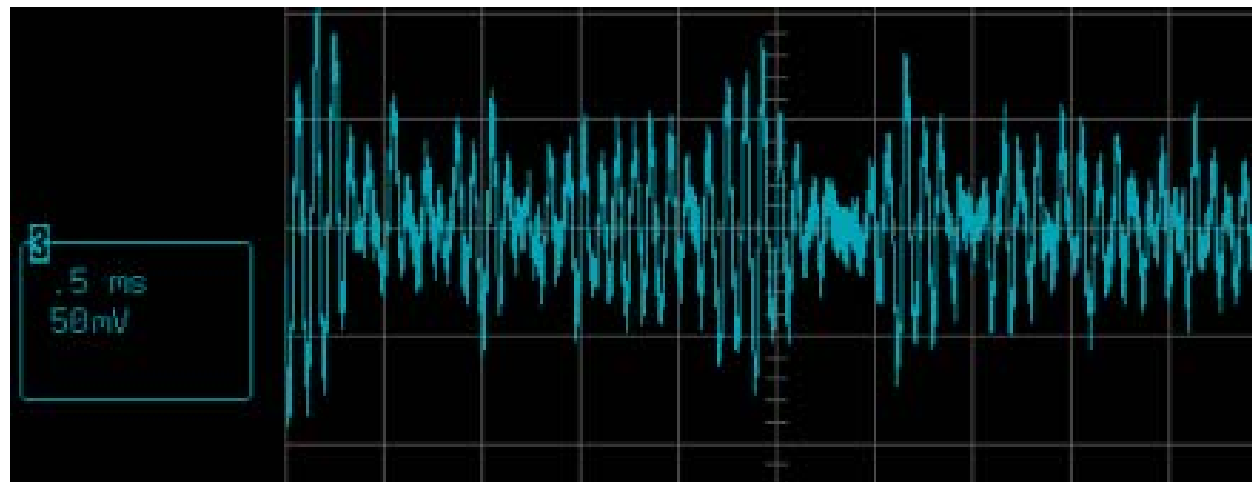
Ionization signal with micromegas

Ionization signal on anode (micromegas):



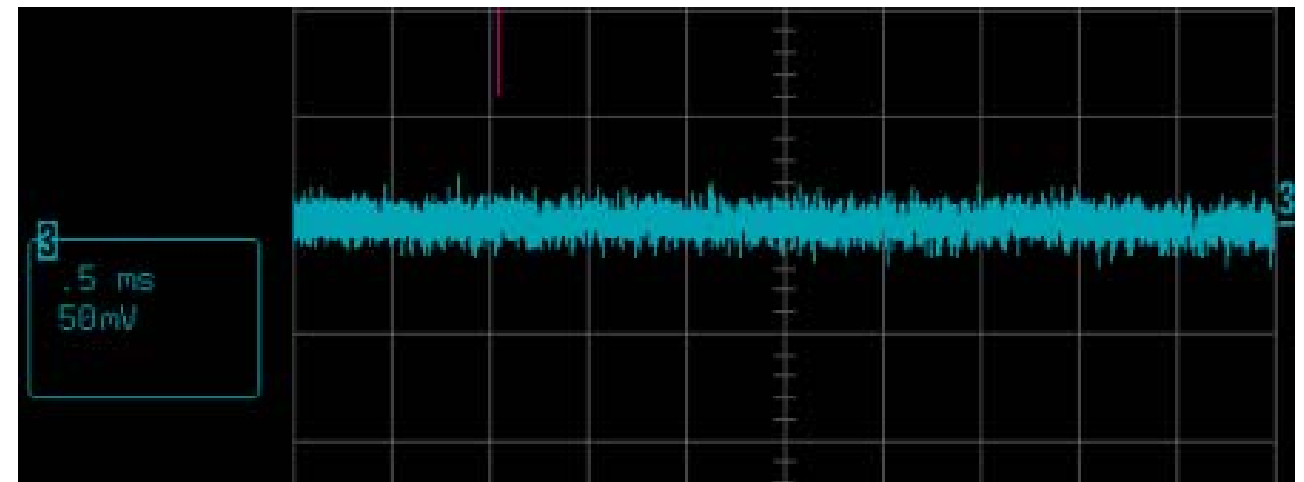
PTR OFF

Electronic noise on anode :



PTR ON

mechanical vibrations from PTR

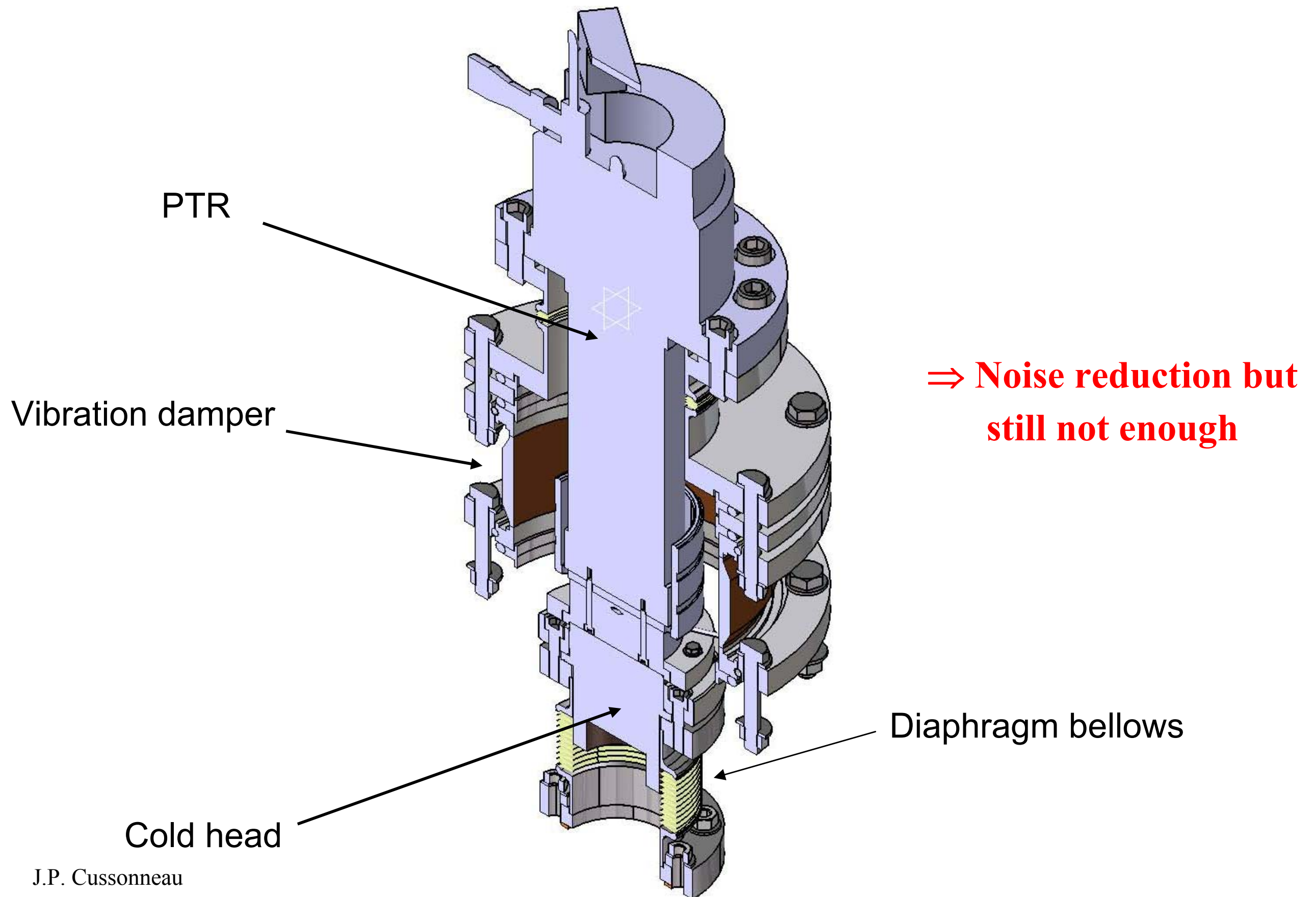


PTR OFF

anode noise : ≤ 3000 e⁻ with PTR OFF

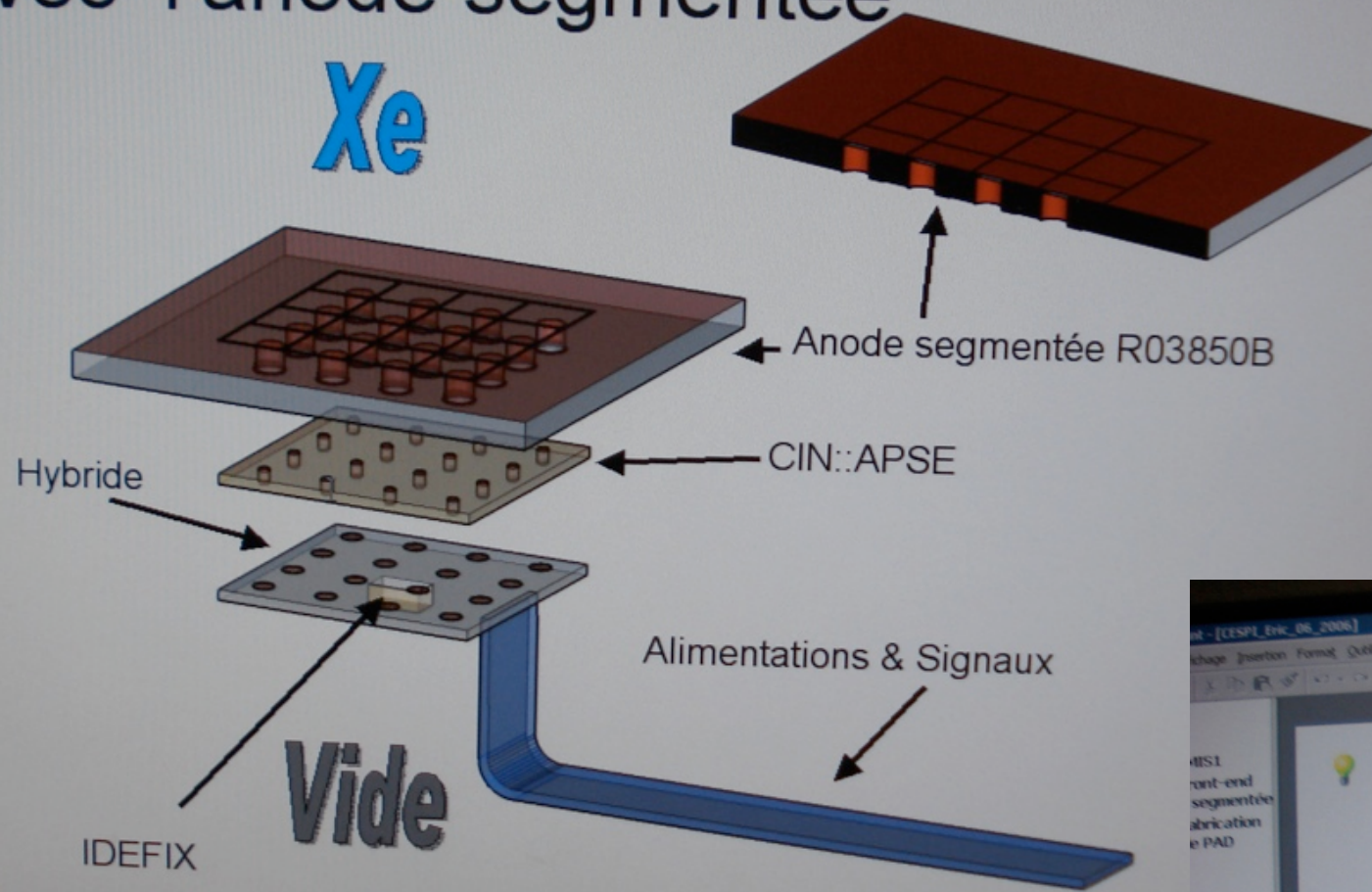
$\Rightarrow$ important modification on PTR support

New PTR support april 2008

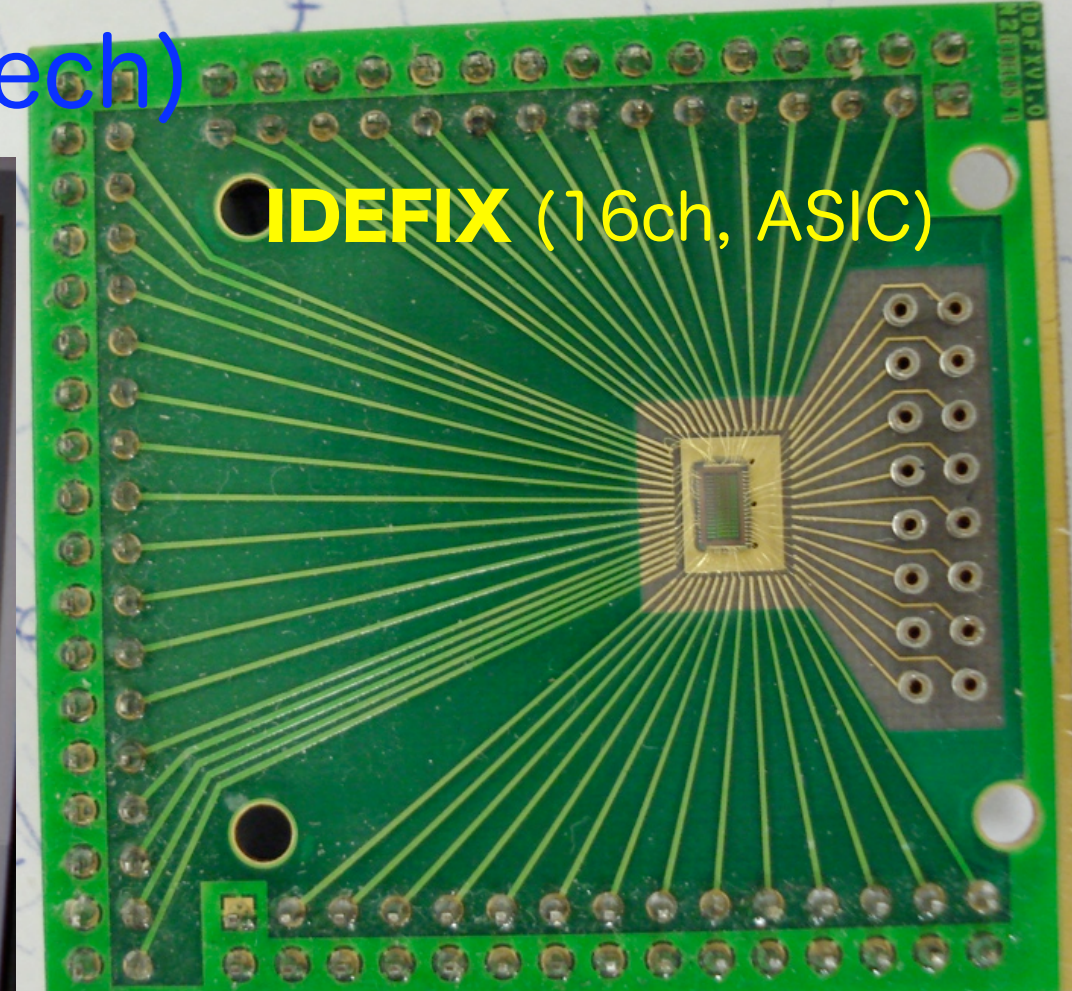


Front-End Readout system (Subatech)

Montage du front-end
avec l'anode segmentée



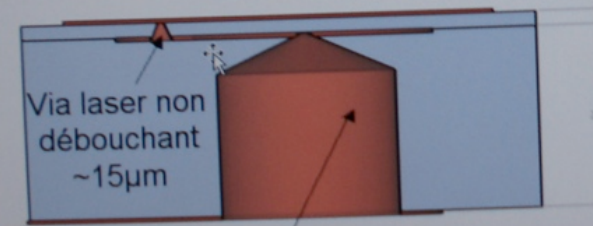
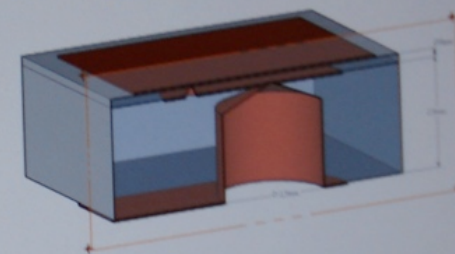
IDEFIX (16ch, ASIC)



Détail sur la fabrication du
plancher de PAD

Matériaux: RO4380B

- Céramique renforcée avec de la fibre de verre (ep=2.5mm).
- Coefficient de dilatation proche de l'inox et du cuivre (17ppm/°C)
- Bonne caractéristique diélectrique (Facteur de dissipation 0.004)



Trou 2.5mm métallisé

Mise en place d'un banc de test

- Tenue mécanique (ESPI)
- Tenue en température (Azote)
- Caractérisation électrique du plancher (bruit)
- Validation de la connectique anode / front-end (Hybride+CIN::APSE)

