

Réunion ThomX

25 septembre 2023

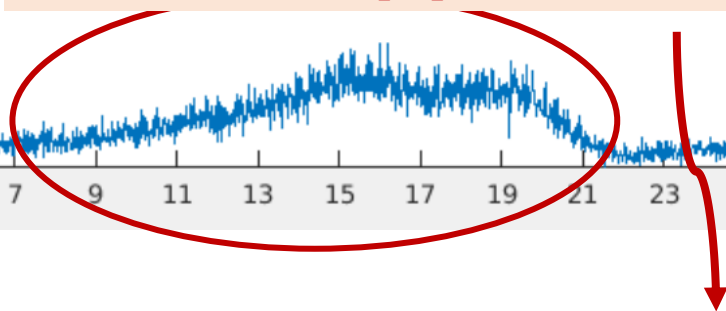
Ligne X

Come back to the first X-ray spectrum with the CdTe spectro

Spectrum 26/07/2023
(Calibration performed on 25/07/2023 with welding wire Sn)

Absorption lines of Cd and Te:
23.2, 26.1, 27.5 and 31.0 keV

→ These are “Escape peaks” and not diffusions



Energy (keV)

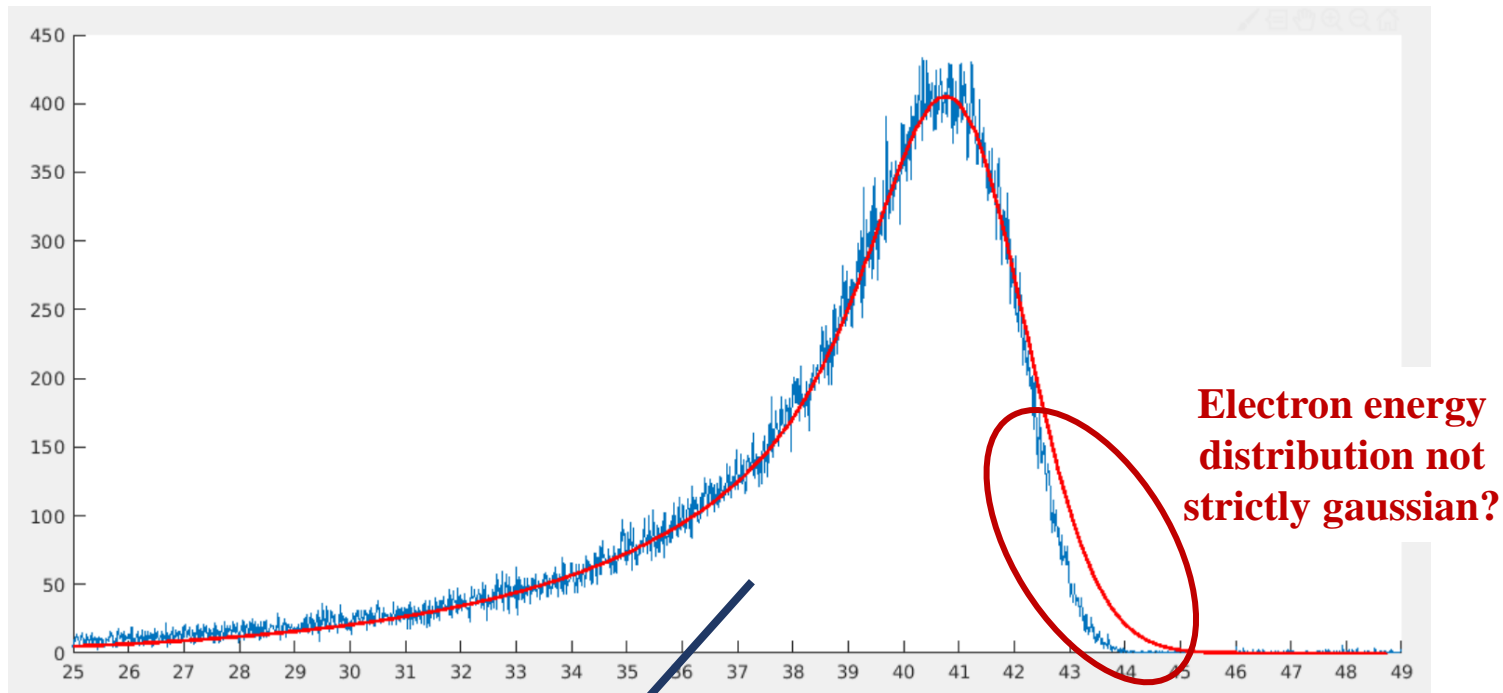
To be confirmed with another spectrum acquired with our 3 systems of slits sufficiently closed to allow only the beam to pass, BUT, already, if they were diffusions in this spectrum, they should also be visible between 20 and 30 keV

→ I think there is not or very little of diffusions in this spectrum → possible to exploit it

Fit of the spectrum

Hypotheses

- * GAUSSIAN distributions for e- energy, laser energy (rms totally negligible), e- divergence, laser divergence
- * LASER transv. size = 60 μm (\rightarrow div laser = 1.4 mrad)
- * The detector was ON-AXIS (CdTe 5x5 mm at 10.5 m from the IP)



E_e 47.6 MeV
 σ_{E_e}/E_e (rms) 1.4 %
div e- (rms) 3.1 mrad

For e- transv. size = 80 μm :
 $\rightarrow \epsilon_N = 23.2 \text{ mm.mrad}$
(for « only » 100 pC)



An other fit in the case the **detector was OFF-AXIS by 20 mm** during the data taking
(which I don't think it was ...),

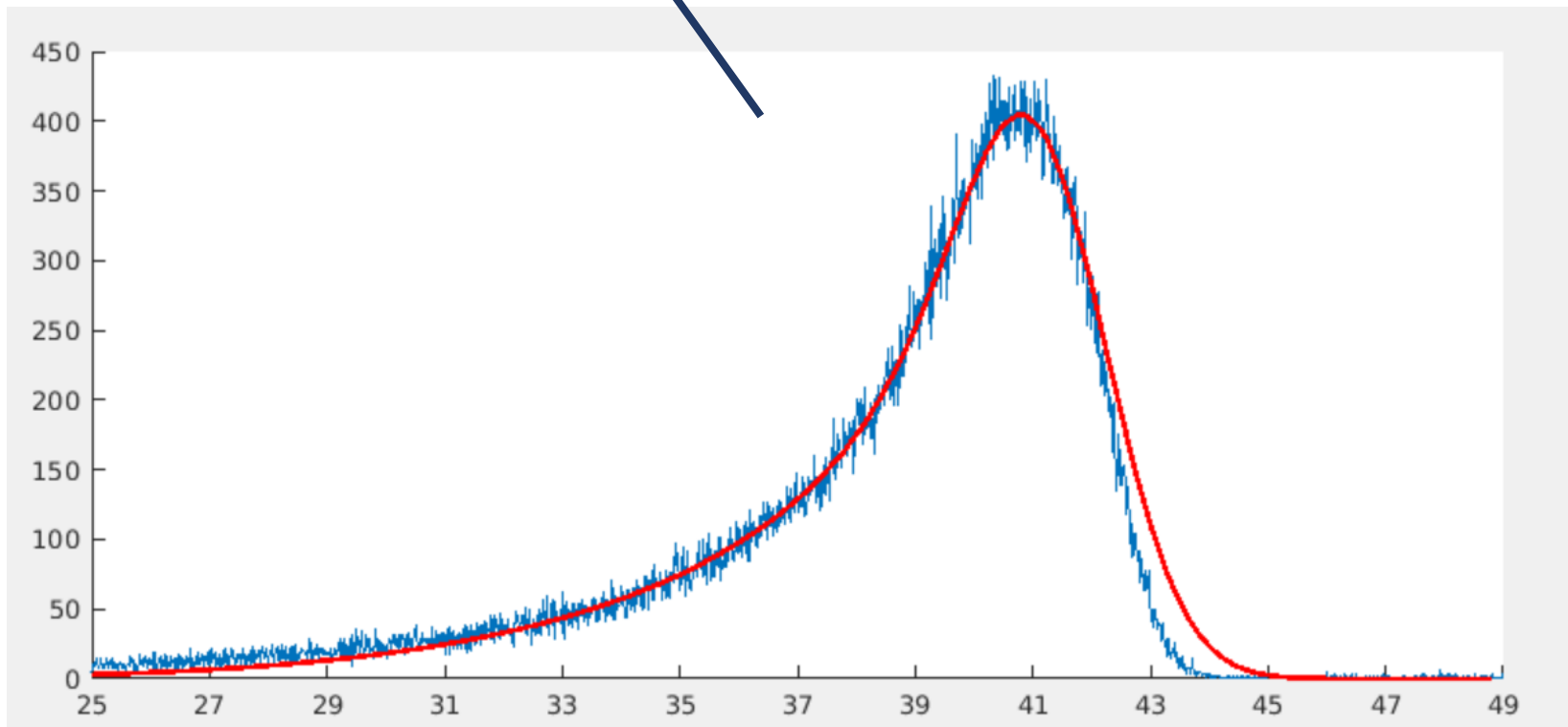
The adjustment leads to:

E_e		47.6 MeV
σ_{E_e}/E_e	(rms)	1.4 %
div e-	(rms)	2.2 mrad

For e- transv. size = 80 μm :

$\rightarrow \epsilon_N = 16.4 \text{ mm.mrad}$
(for « only » 100 pC)

still



- TDR:

Injector parameters:

Parameters	Mode 1	Mode 2	Mode 3	Unit
Q	1	0.5	0.1	nC
$\sigma_{x,y}$	1.65	1.5	0.8	mm
$\varepsilon_{x,y}$	4.7	3.3	1.1	π .mm.mrad
σ_z	4.4	4	3.3	ps
σ_E/E	0.4	0.3	0.2	%

RING parameters:

ε_N
 σ_{Ee}/E_e

5
 0.4-0.6%

- Preliminary X-ray results at 0.1 nC, in comparison with the TDR:

ε_N : ~ 20 times larger

σ_{Ee}/E_e : ~ 5 times larger

→ How to investigate/improve this?

Reminder: X-ray Brightness $\sim \frac{1}{(\sigma_{Ee}/E_e)^* (\varepsilon_N)^2} \dots$