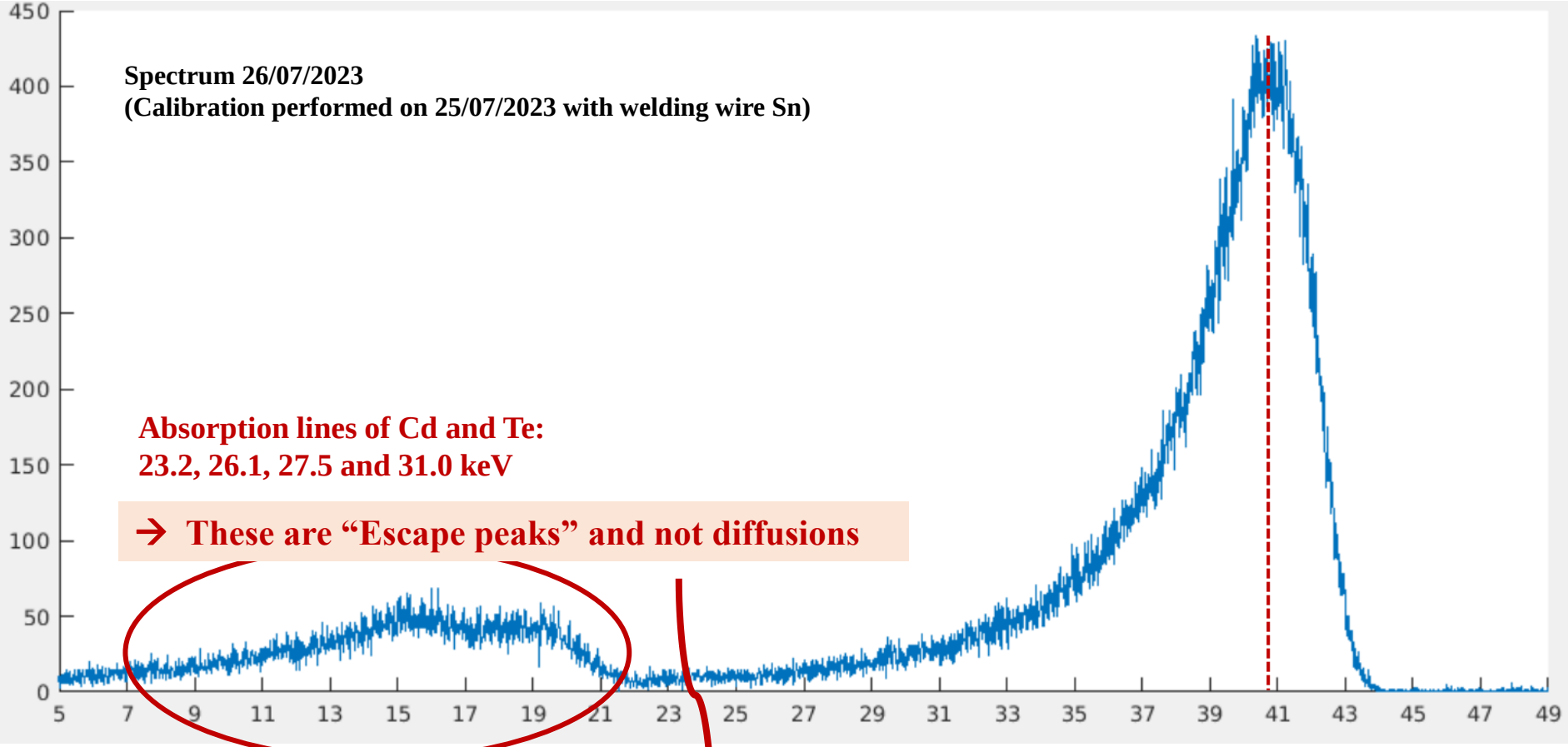
Réunion ThomX

2 octobre 2023

Ligne X

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



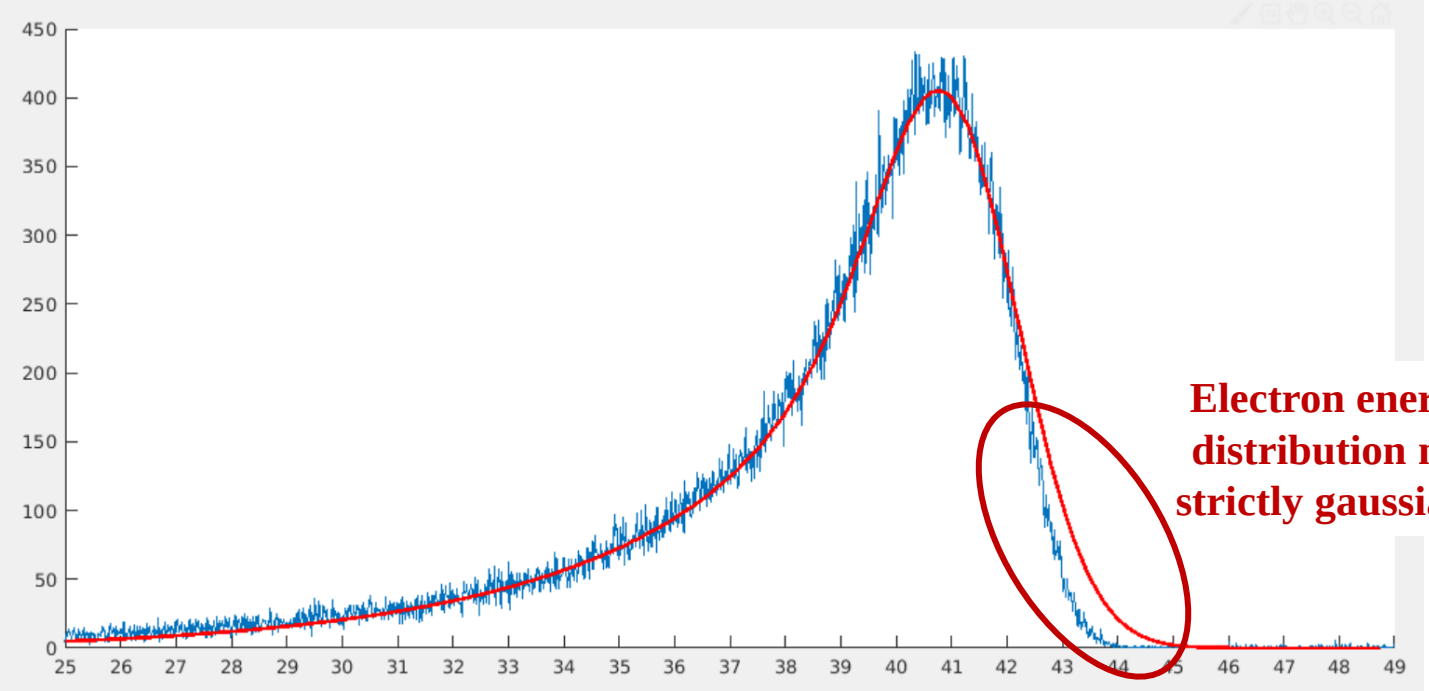
To be confirmed with another spectrum acquired with our 3 systems of slits sufficiently closed to allow only the beam to pass, BUT, already, if they were diffusions in this spectrum, they should also be visible between 20 and 30 keV

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

Fit of the spectrum

Hypotheses

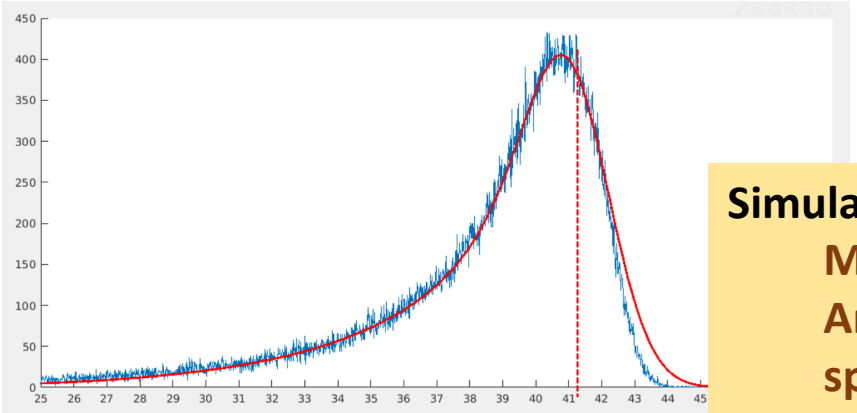
* GAUSSIAN distributions for e- energy, laser energy (rms totally negligible), e- divergence, laser divergence
* LASER transv. size = 60 µm (→ div laser = 1.4 mrad)
* The detector was ON-AXIS (CdTe 5x5 mm at 10.5 m from the IP)



Fit of the spectrum

Hypotheses

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



Compton edge

Simulation with :

M. Jacquet* & C. Bruni,
Analytic expressions for the angular and the spectral fluxes at Compton X-ray sources,
J. Synchr. Rad. (2017), 24

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

For e- transv. size X_e = 80 µm (measured):

$\varepsilon_N = \gamma * X_e * (\text{div e}) = 23.2$ mm.mrad

(for « only » 100 pC…)

No need β, no need machine operation point to extract this emittance value