

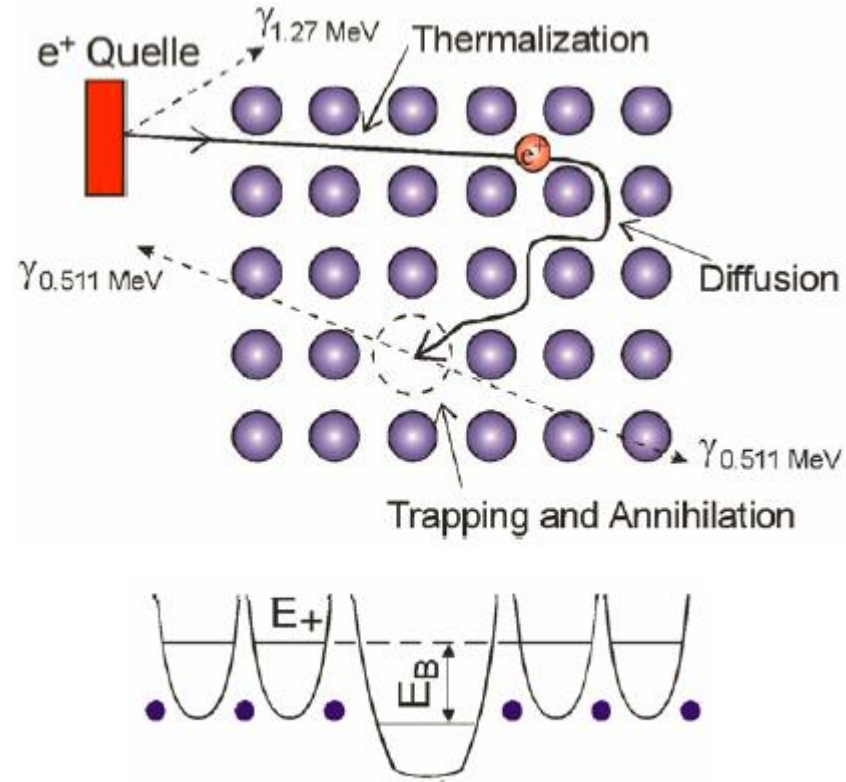
Matúš Saro

POUŽITIE LYSO A PLASTICKÝCH SCINTILÁTOROV PRE POTREBY PAS

26.4.2018



PALS



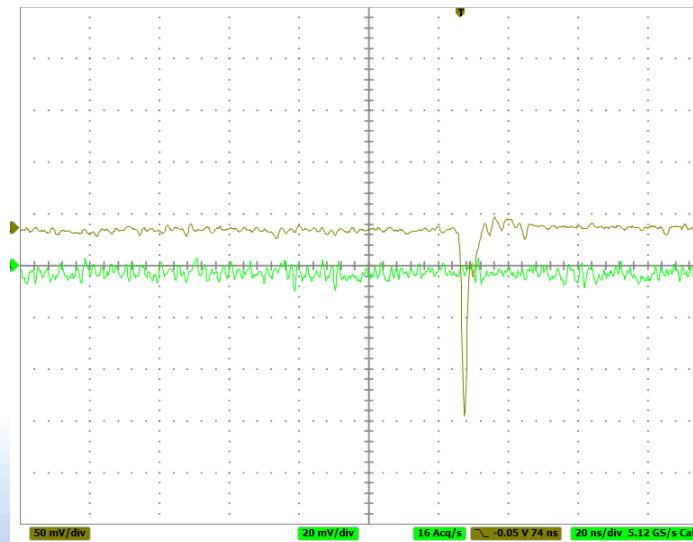
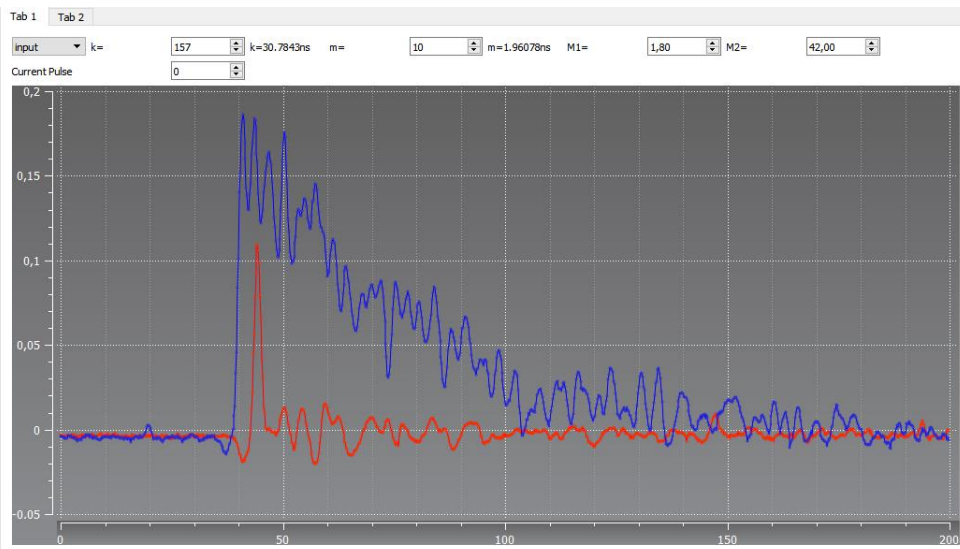
- Termalizované pozitrony anihilujú v defekte
- Po anihilácii emitovanie 2x511 keV fotónov
- Život pozitronu je meraný ako časový rozdiel medzi detekciou 1274 keV a 511 keV fotónu
- Možná identifikácia a kvantifikácia defektov

$$\begin{aligned} \frac{dy_b}{dx} &= -\lambda_b P_b - \kappa P_b \\ \frac{dy_d}{dx} &= -\lambda_d P_d - \kappa P_d \end{aligned} \quad \Rightarrow \quad \begin{aligned} \tau_1 &= (\lambda_b + \kappa)^{-1}, \tau_2 = \lambda_d^{-1} \\ I_1 &= 1 - I_2, I_2 = (\lambda_b - \lambda_d + \kappa)^{-1} \end{aligned}$$

$$\kappa_i = \mu_i C_i$$

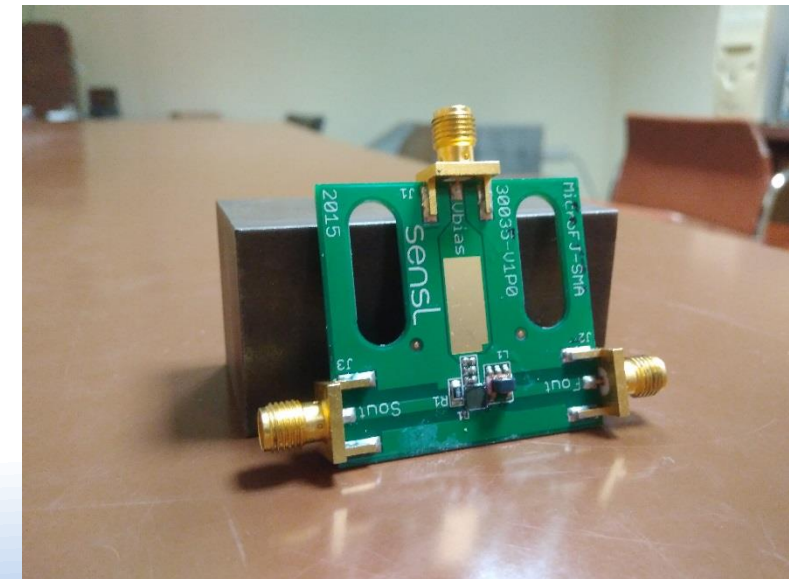
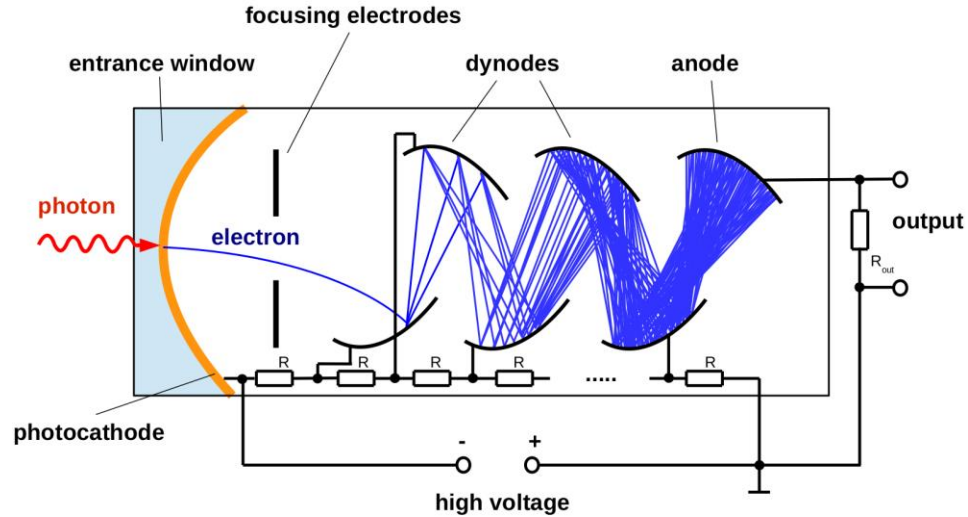
Scintilačné materiály

	BaF2	LYSO	BC420
Hustota [g/cm ³]	4.88	7.1	1.03
Hygroskopickosť	Mierna	Nie	Nie
Vlnová dĺžka v peaku [nm]	310 / 220(195)	420	391
Čas tyla vlny [ns]	630 (pomalá) / 0.6-0.8 (rýchla)	4	1.5
Svetelný výťažok[fotóny/keVγ]	10 (pomalá) / 1.8 (rýchla)	30	11.5

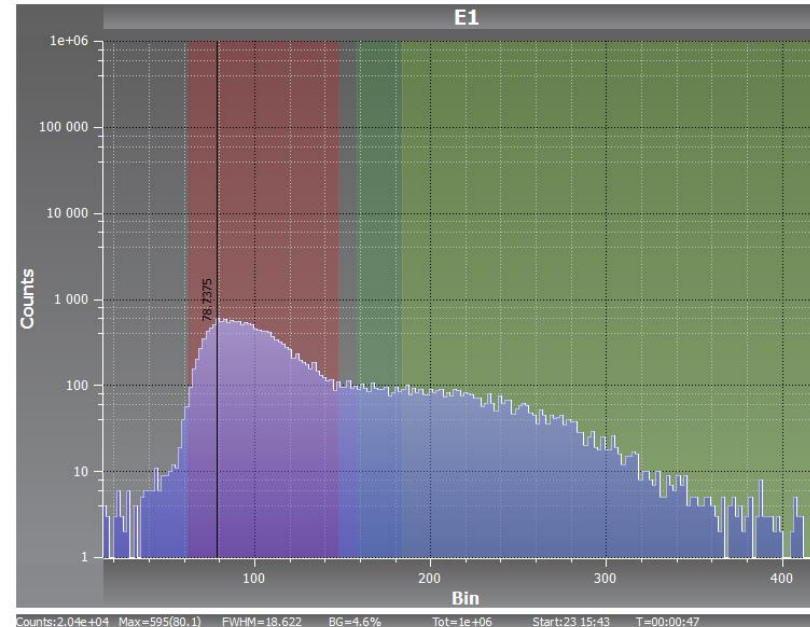


Požité detektory

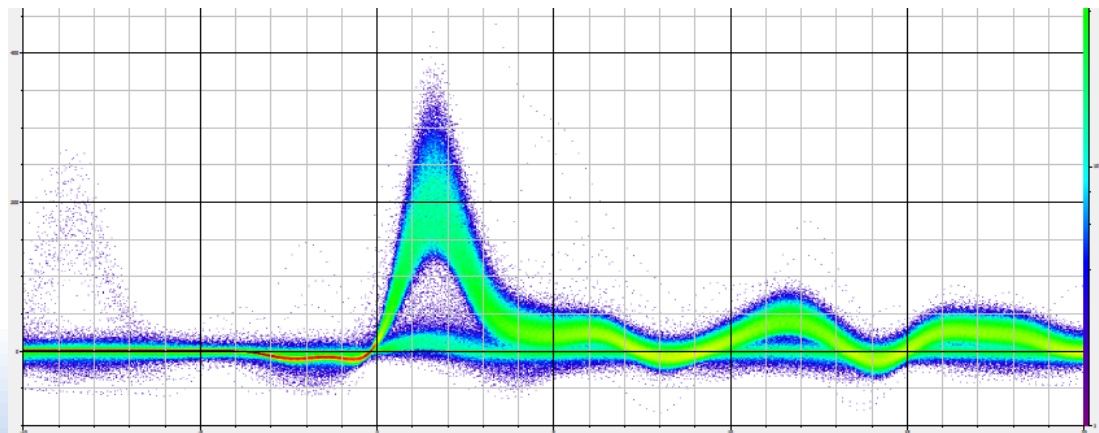
- Photonis XP2020Q
- Sensl MicroFJ-SMA-300
- Ketek PE6650-EB-AX



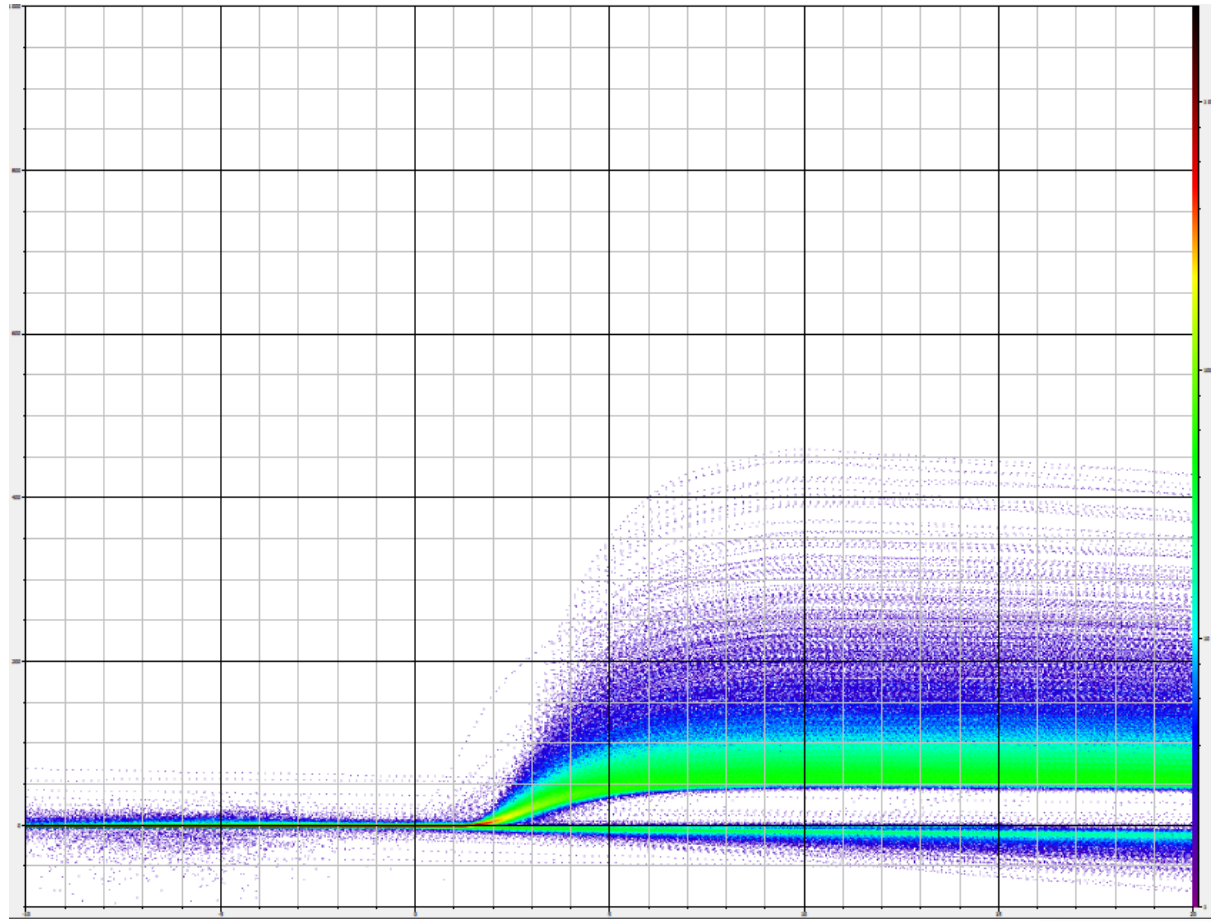
Meranie



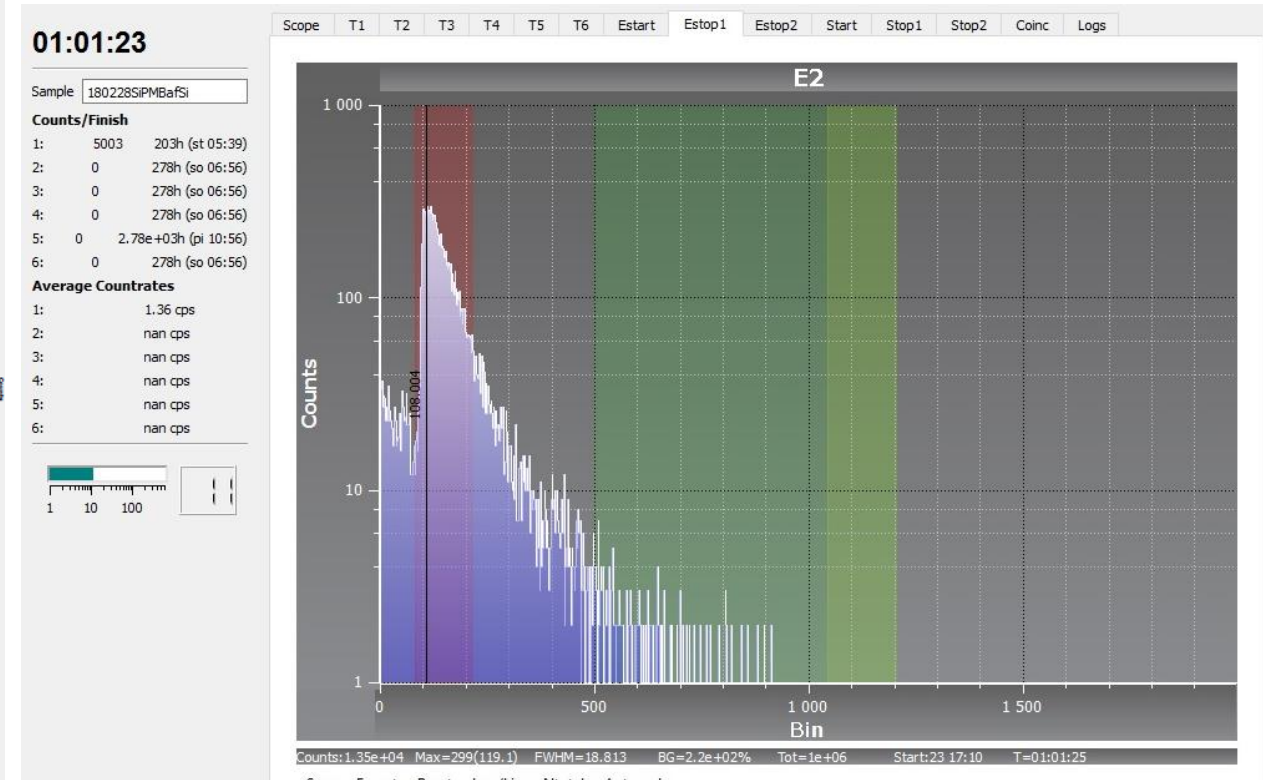
- ^{22}Na
- Ketek-LYSO
- Ketek-BC420
- Sensl-LYSO
- Sensl-BC420



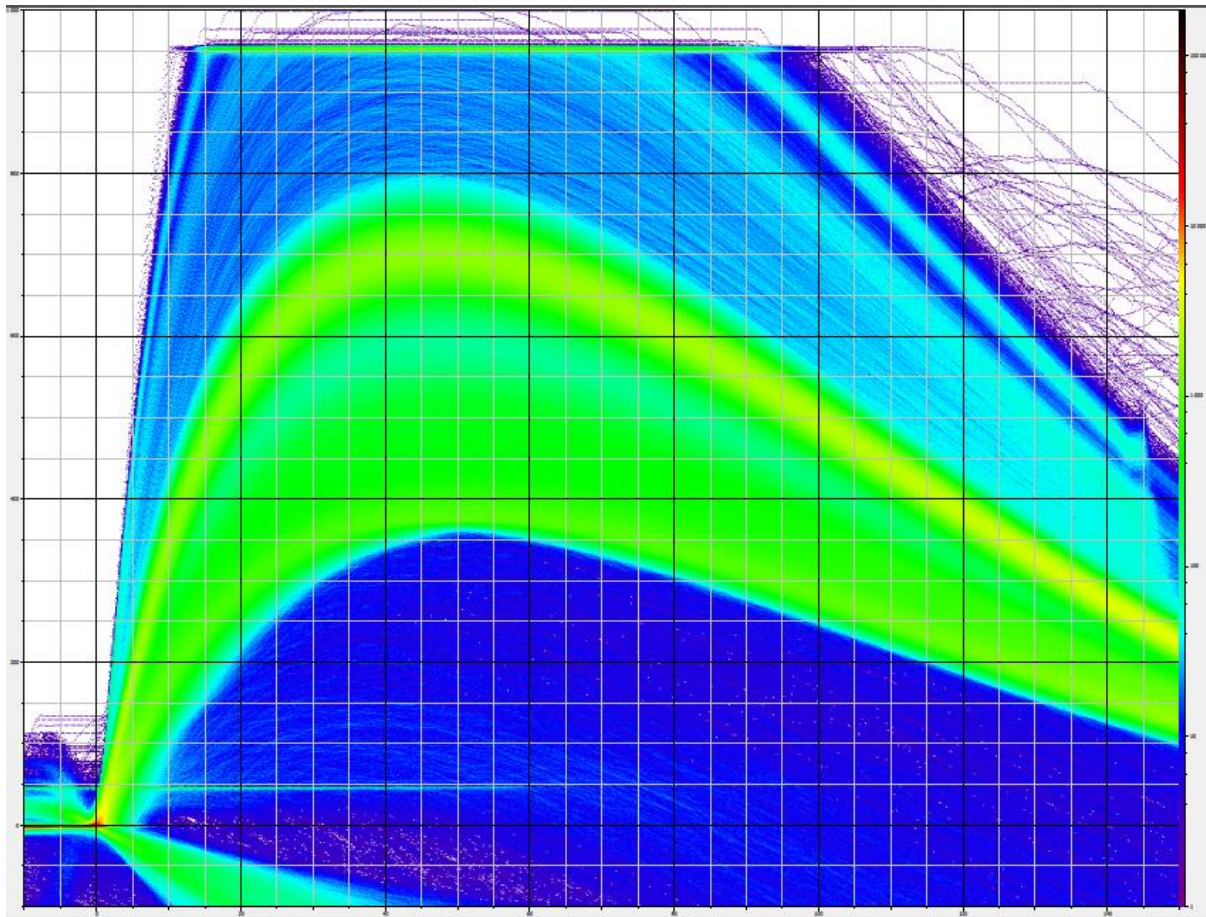
Ketek-BC420



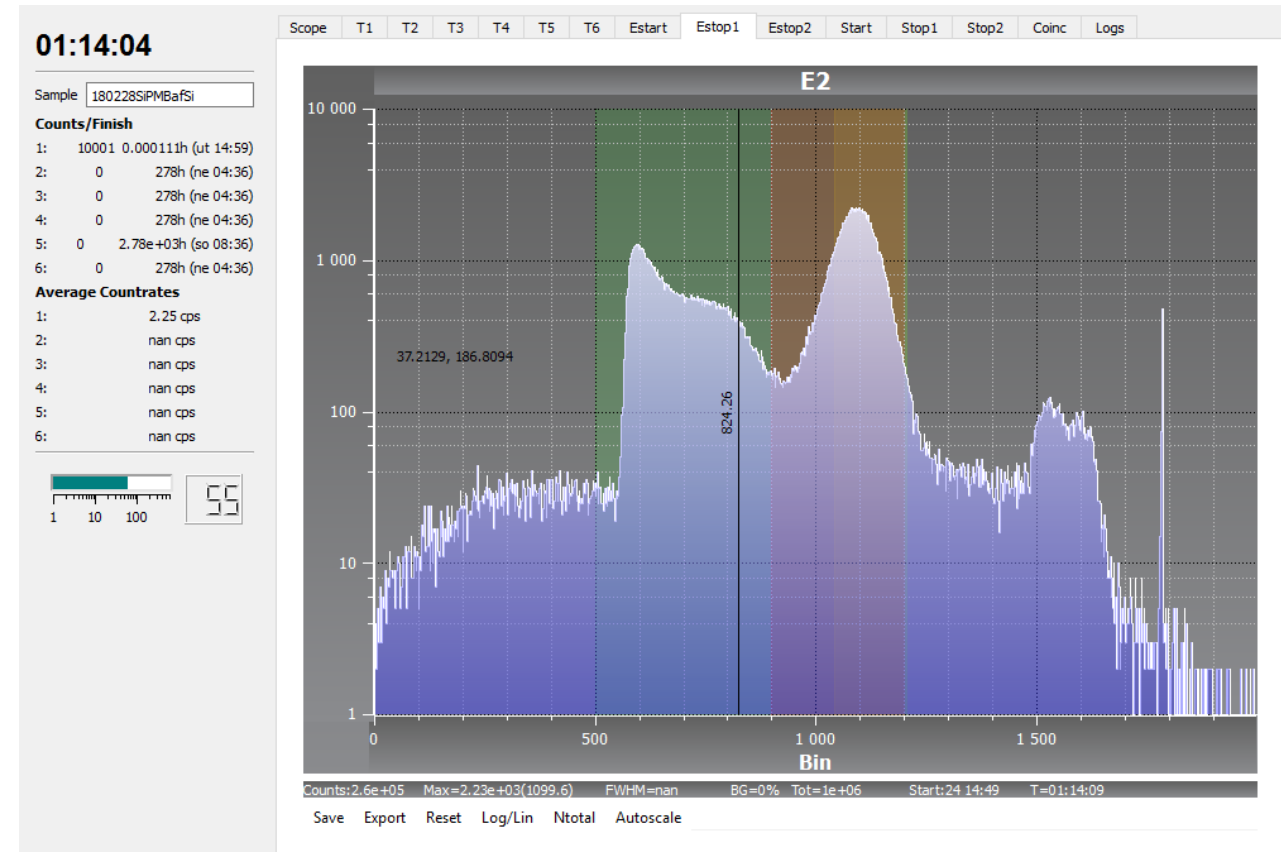
20 ns



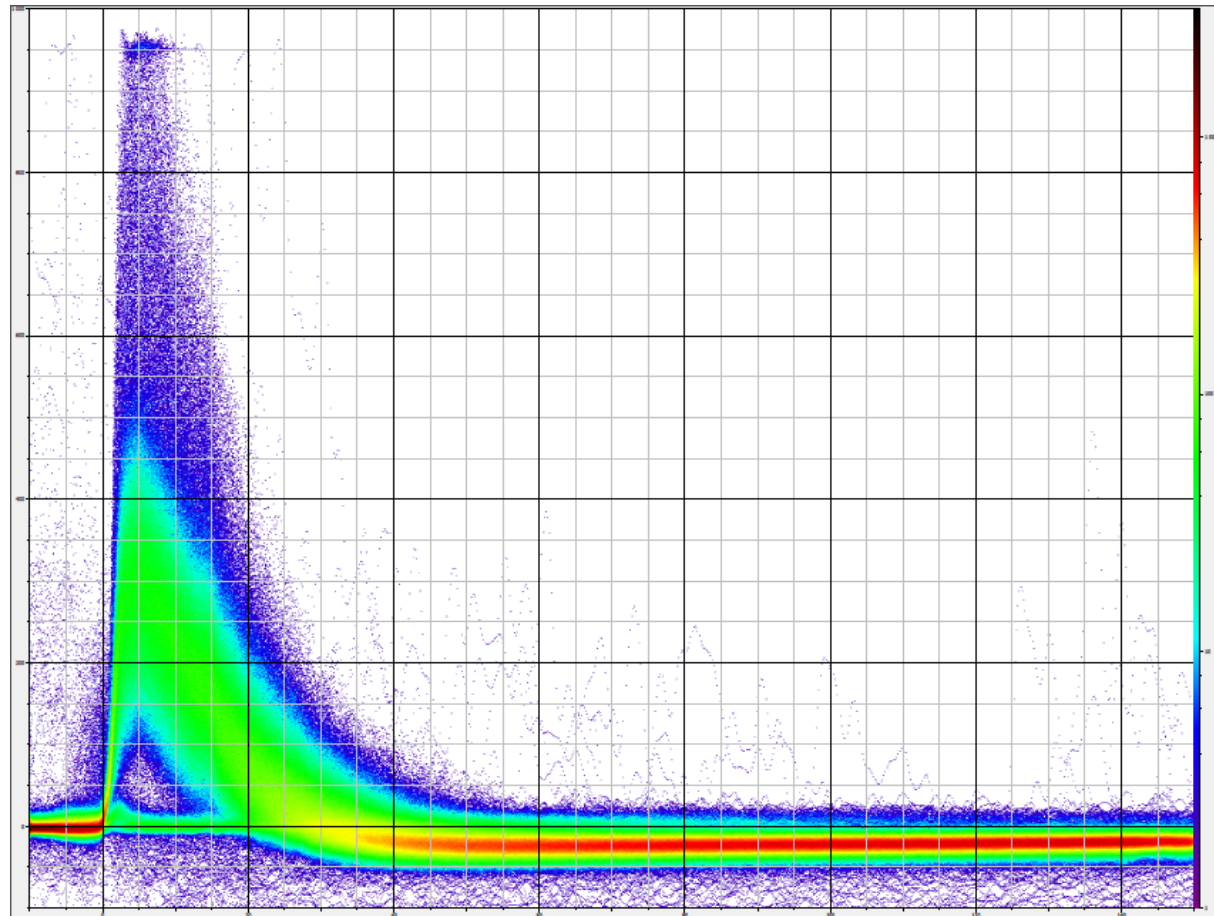
Ketek-LYSO



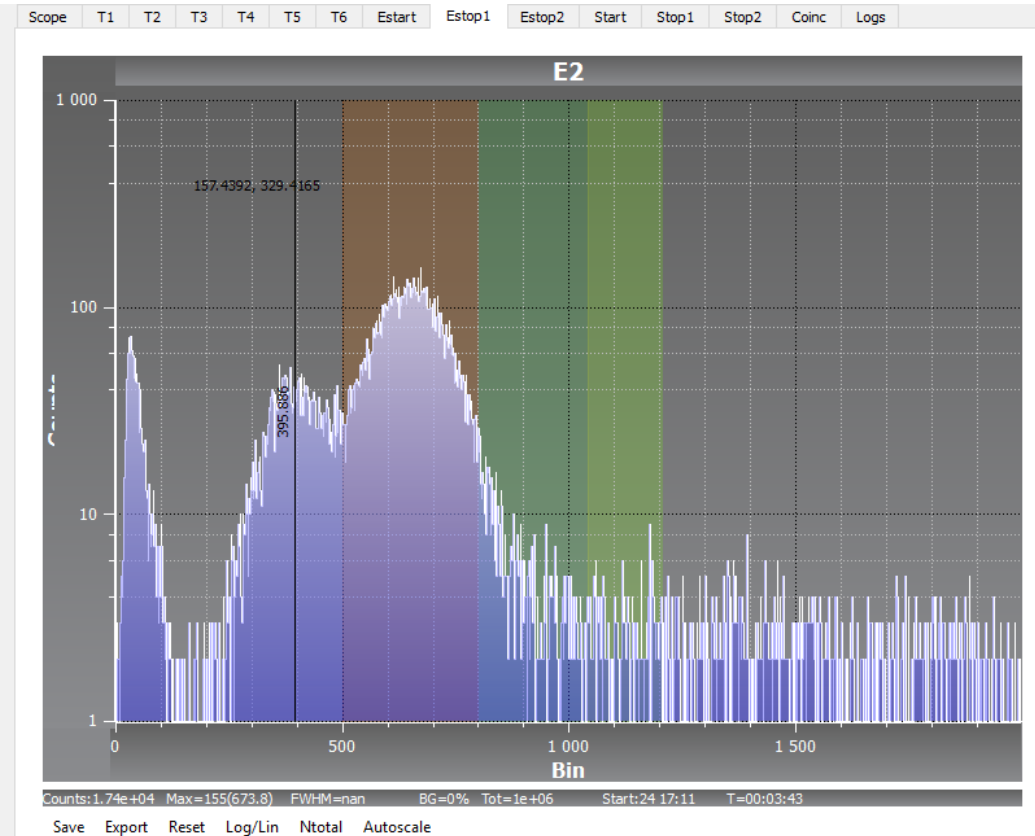
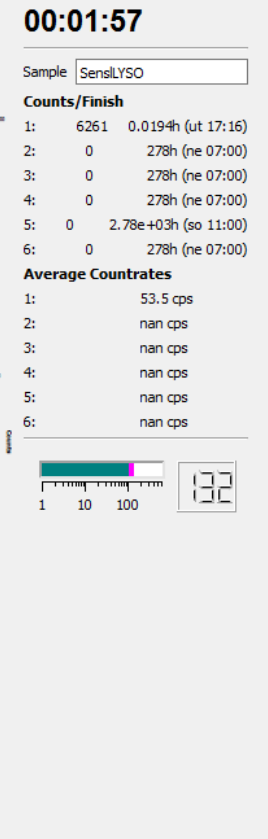
5 ns



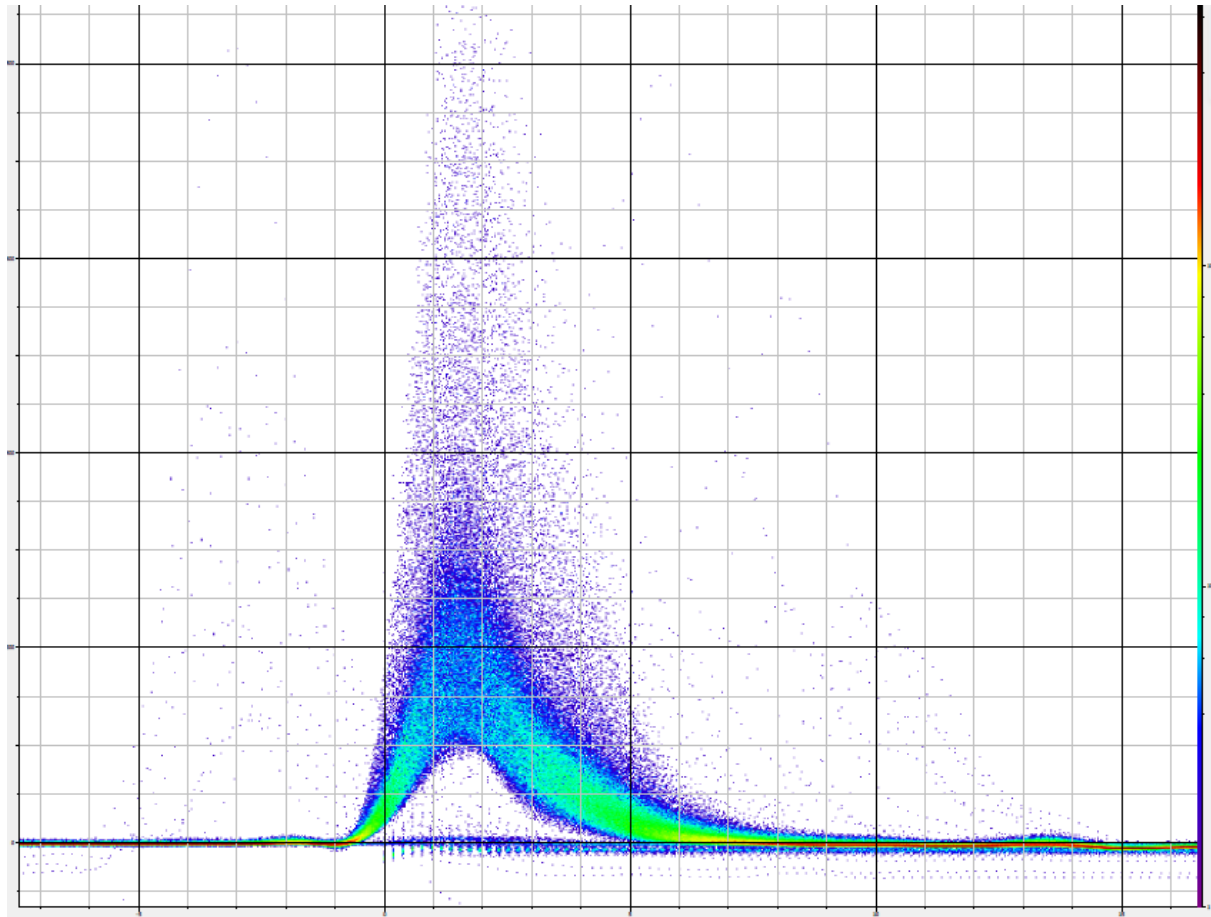
Sensl-LYSO



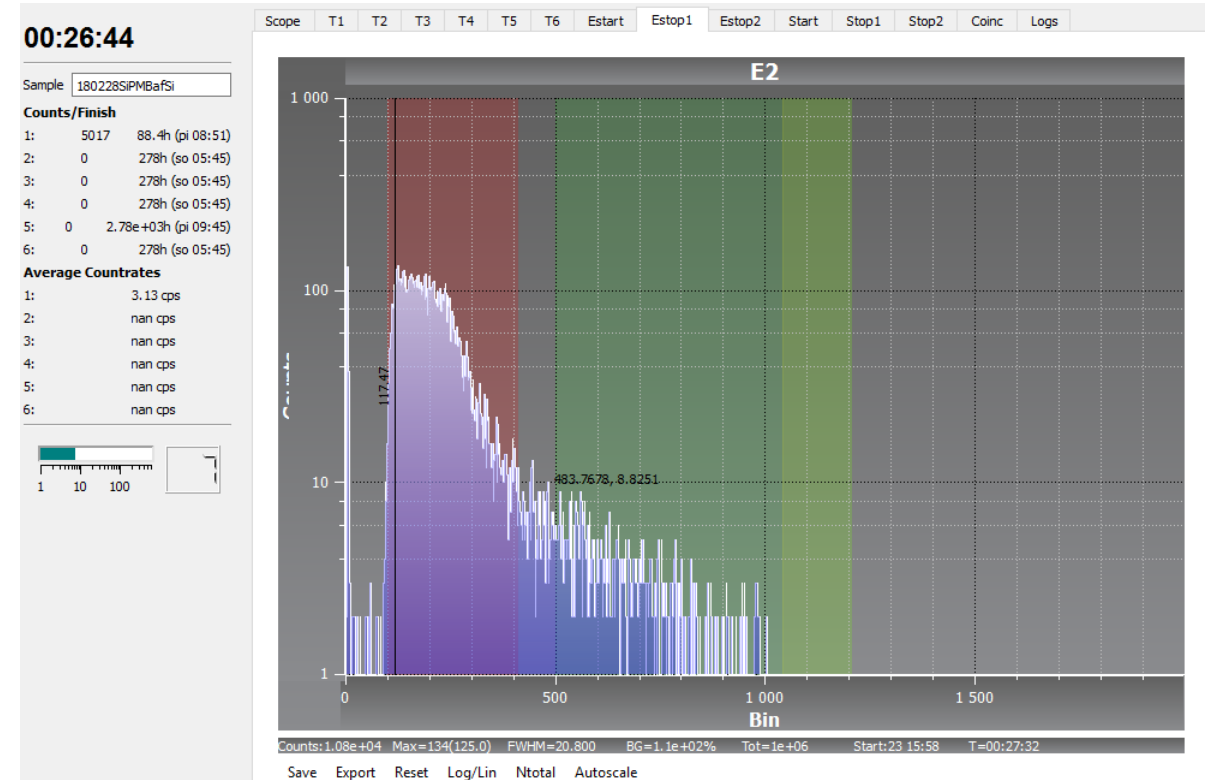
20 ns



Sensl-BC420

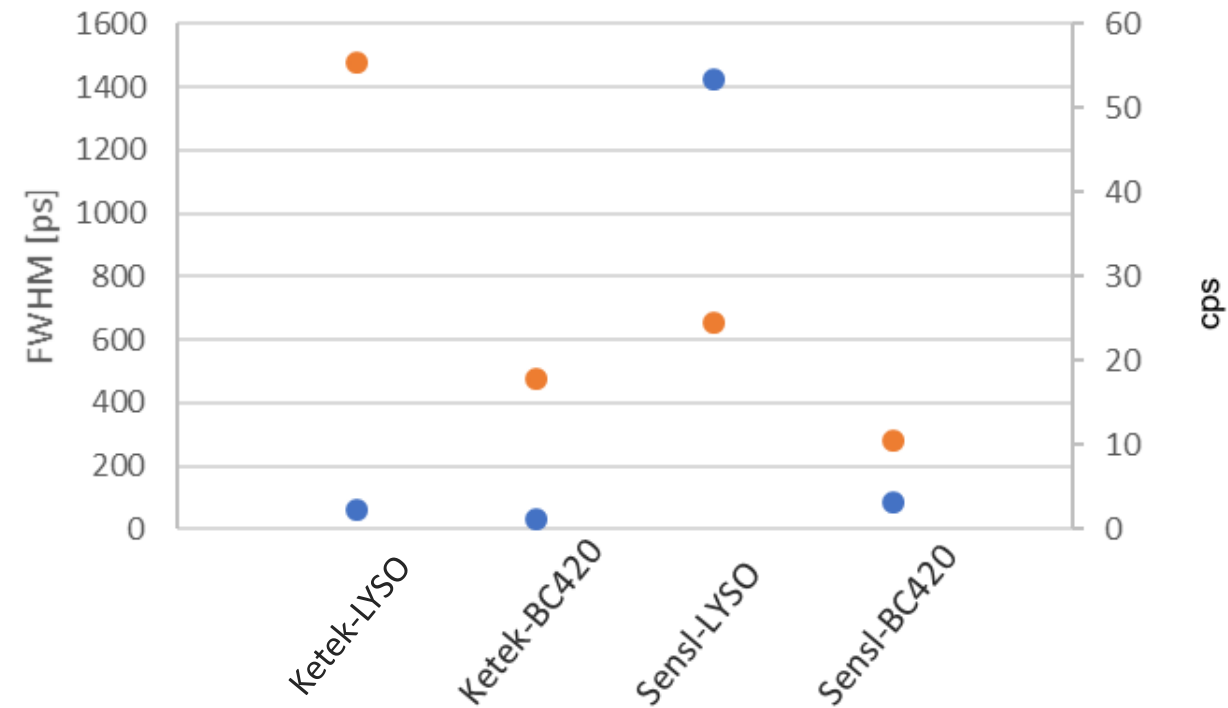
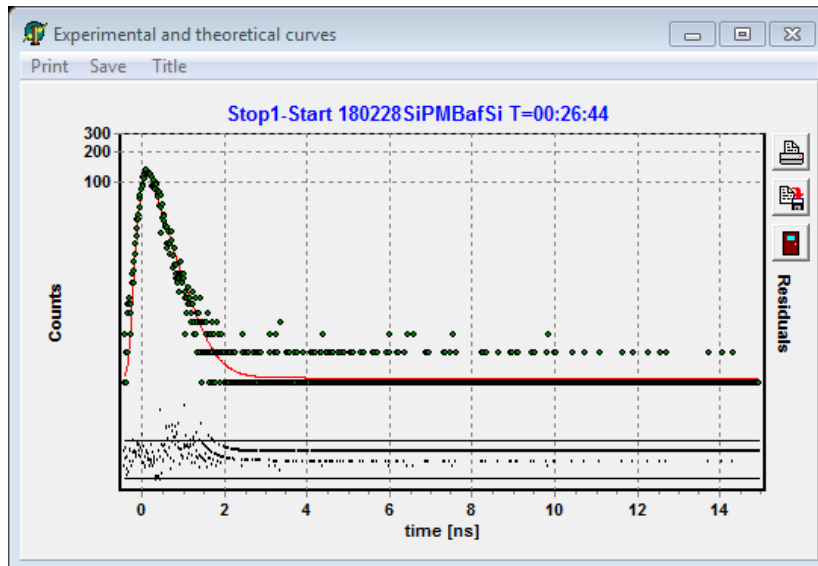


5 ns



Zmena vlastností pre PALS

- PALS:
 - FWHM
 - cps



Závery

- Digitalizácia pulzu a použitý filter majú zásadný vplyv na koncové výsledky softvérovej koincidencie
- Ketek PE6650-EB-AX nie je vhodný pre rýchlu koincidenčnú detekciu. Má však výborné zosilnenie.
- Sensl MicroFJ-SMA-300 je vhodný pre meranie PALS.
- Pre LYSO je potrebné vyvinúť nový filter
- Merania s BC420 ukázali zlepšenie FWHM

Ďakujem za
pozornosť

