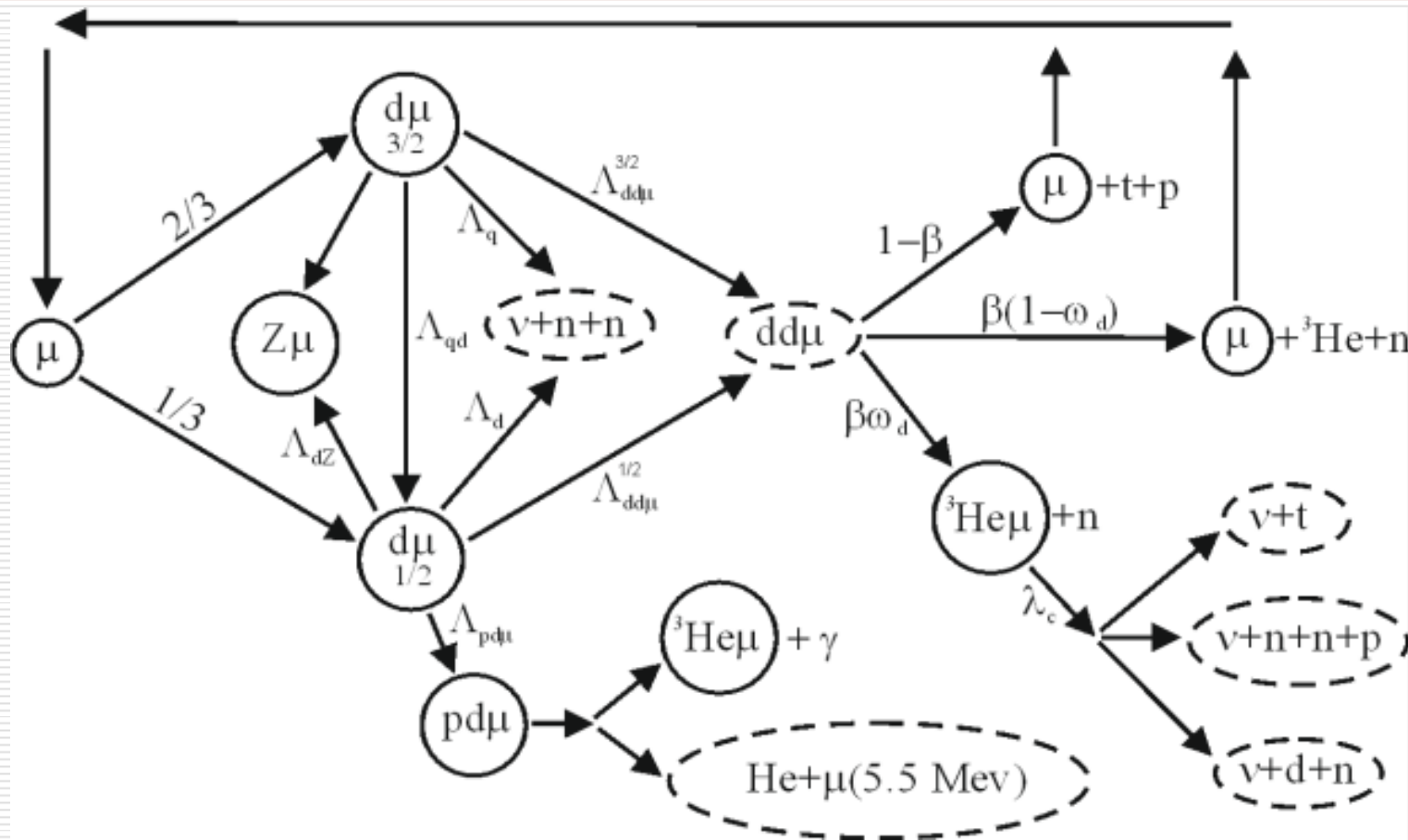


$$\lambda_0 = 455160 \text{ s}^{-1}$$
$$\Lambda_d = 400 \text{ s}^{-1}$$



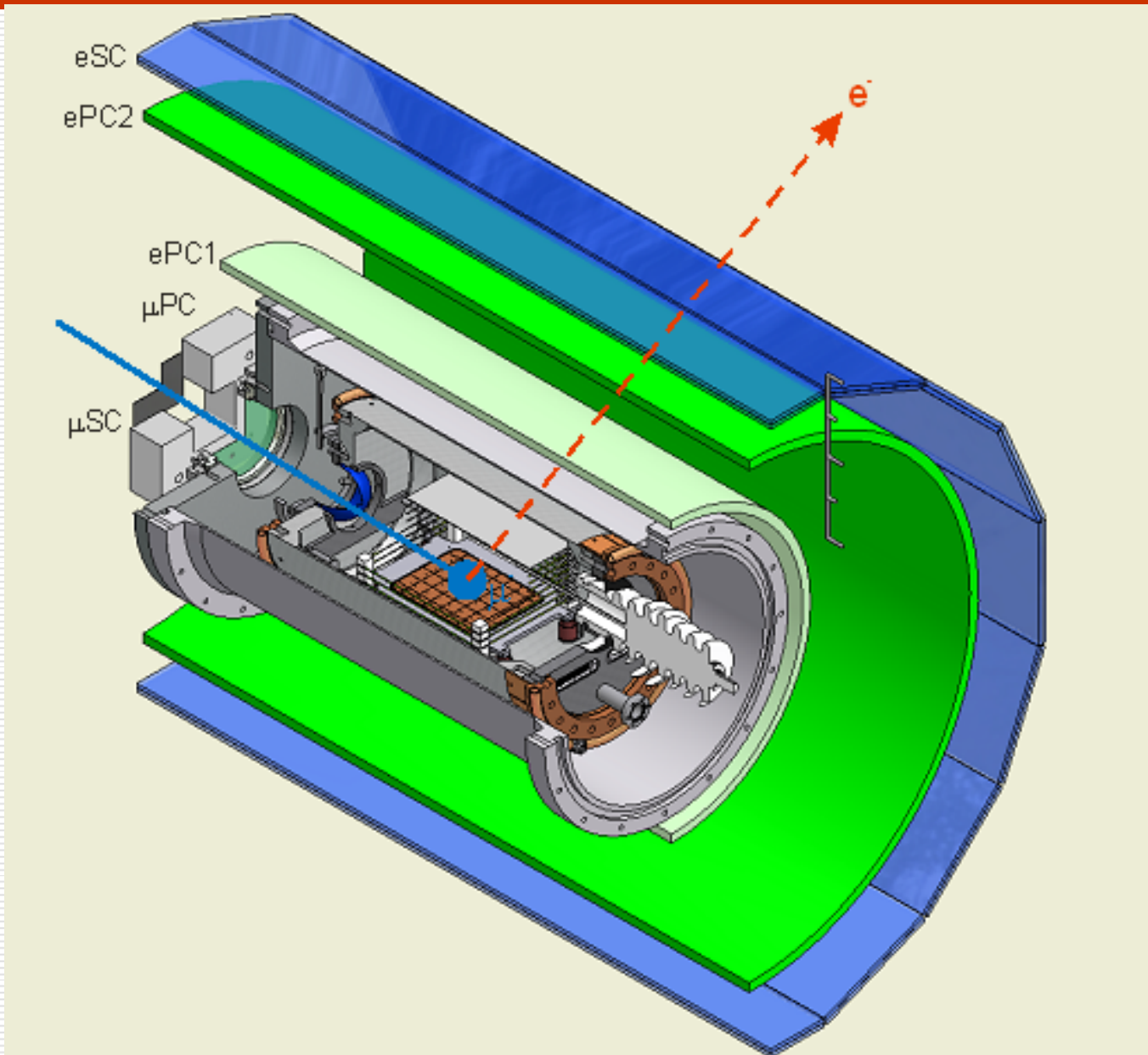
Muon kinetic processes in deuterium



- $\lambda_0 = 455160 \text{ s}^{-1}$
- $\Lambda_d = 400 \text{ s}^{-1}$
- $\Delta\Lambda(dd \rightarrow {}^3\text{He}\mu) = 8 \text{ s}^{-1}$
- $\Delta\Lambda(\text{N}_2) = 4 \text{ s}^{-1}/1\text{ppb}$
- $\Delta\Lambda(\text{HD}) = 2 \text{ s}^{-1}/200\text{ppm}$

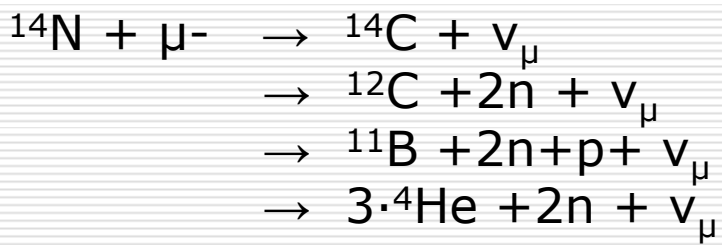
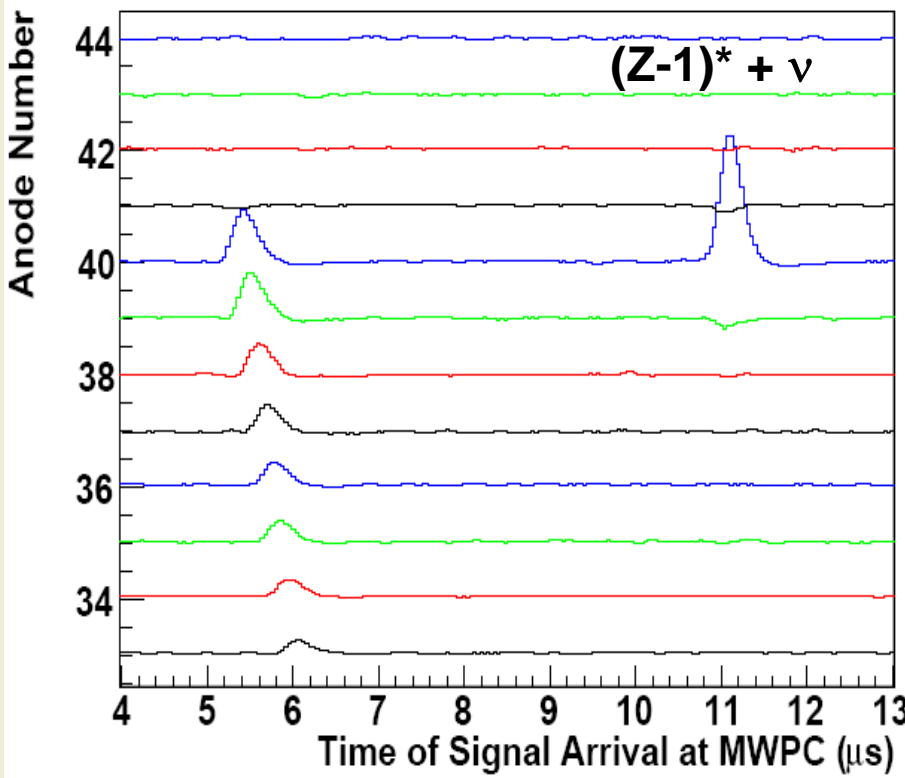
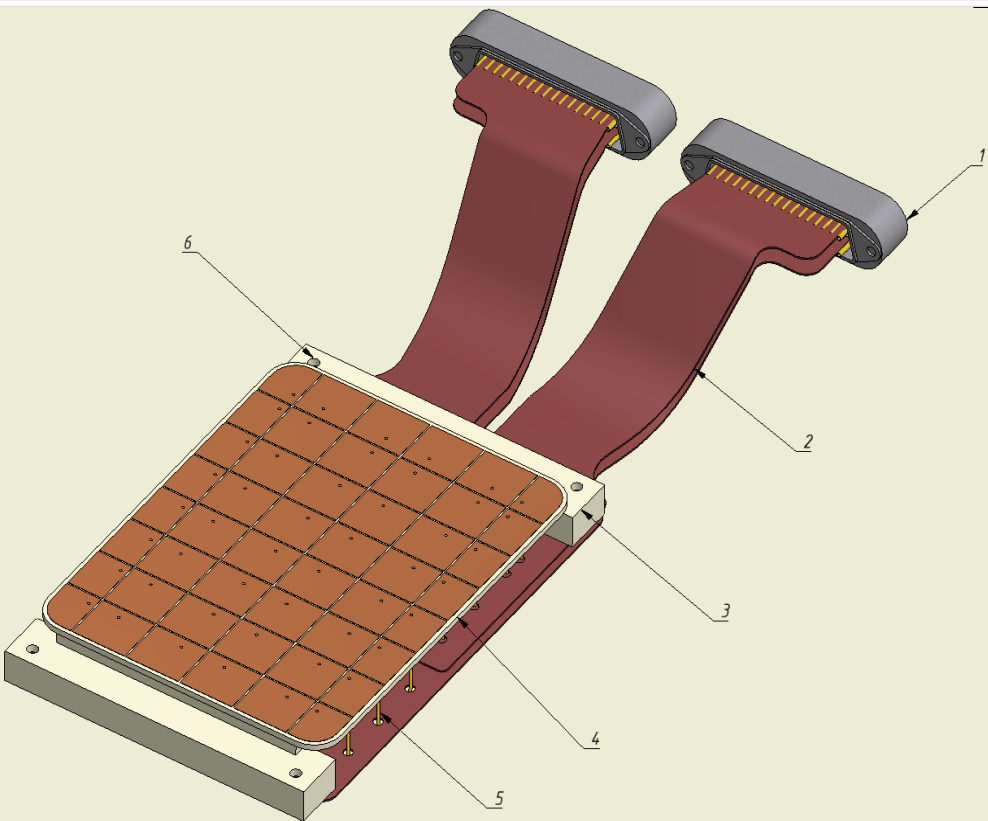


MUSUN setup





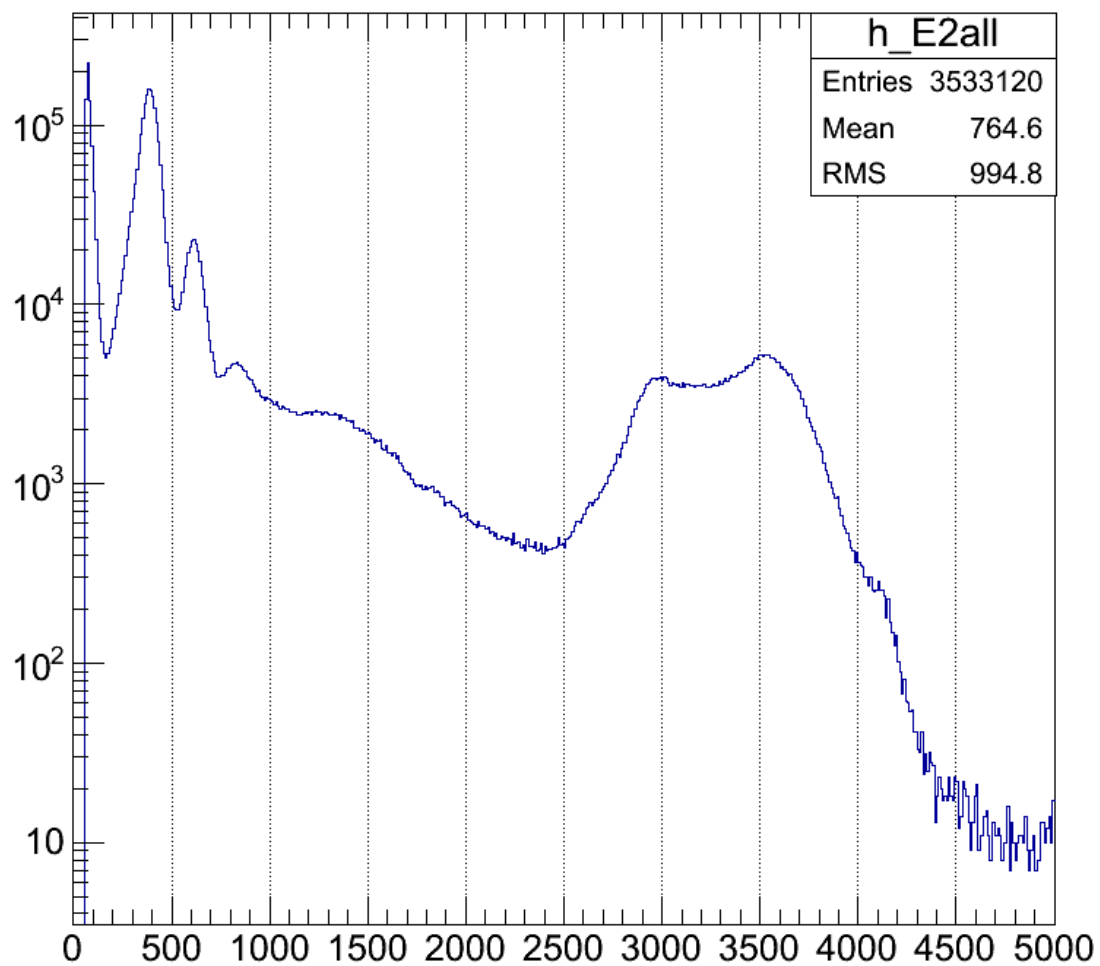
Muons, fusions and recoils in TPC





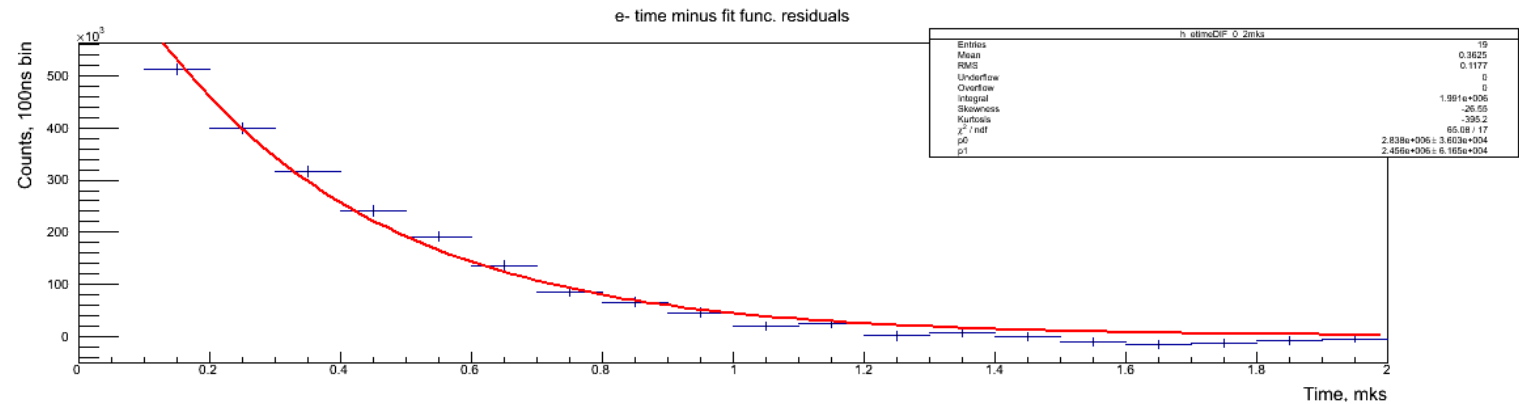
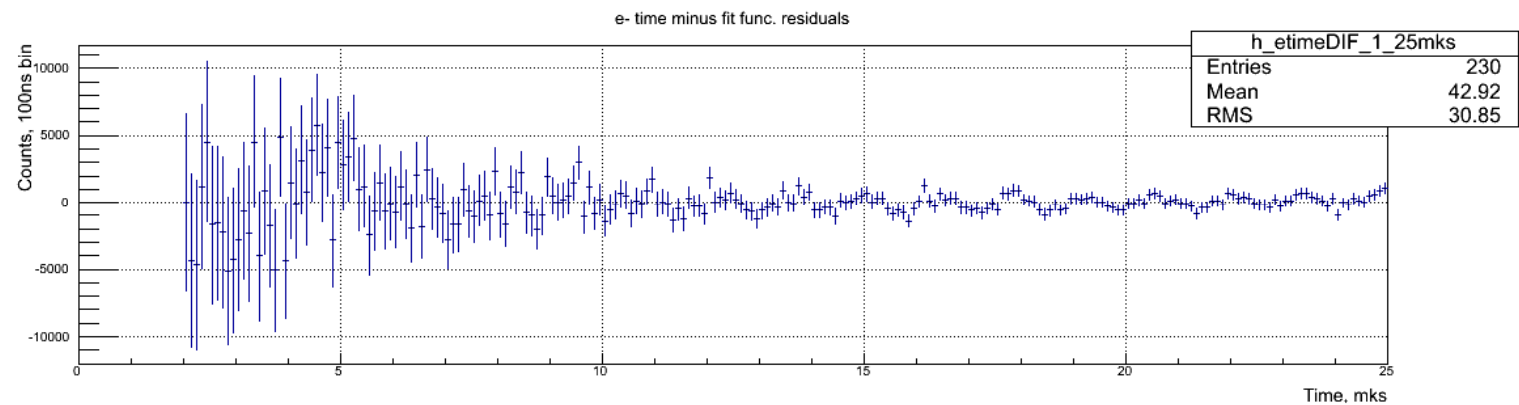
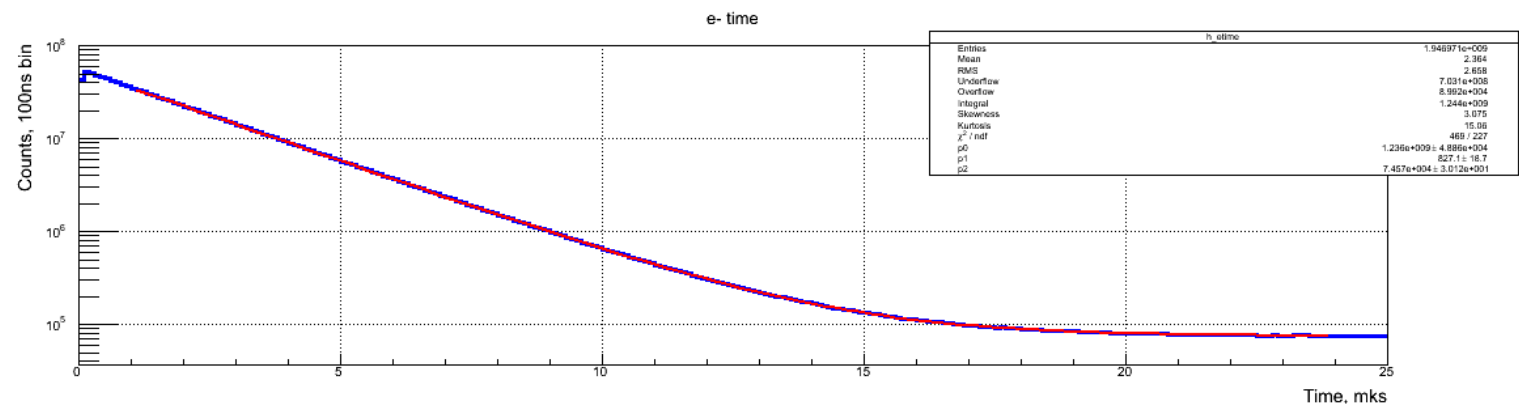
dd fusions in TPC

Second pulse energy (keV, 1ch=0.28keV), with electron, $0 < T_2 < 8\text{mks}$



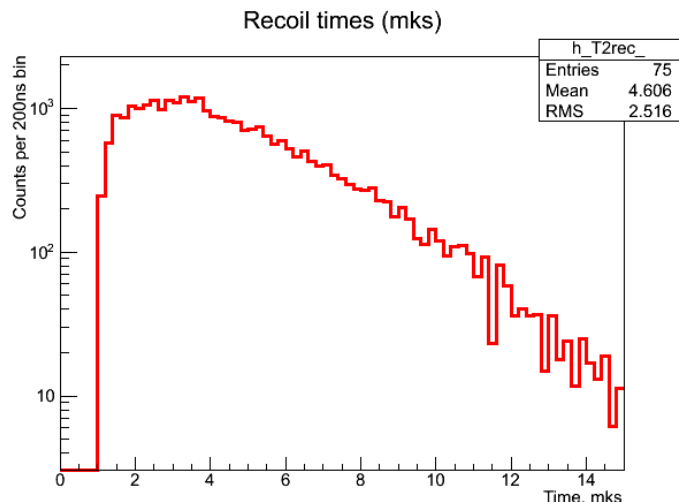
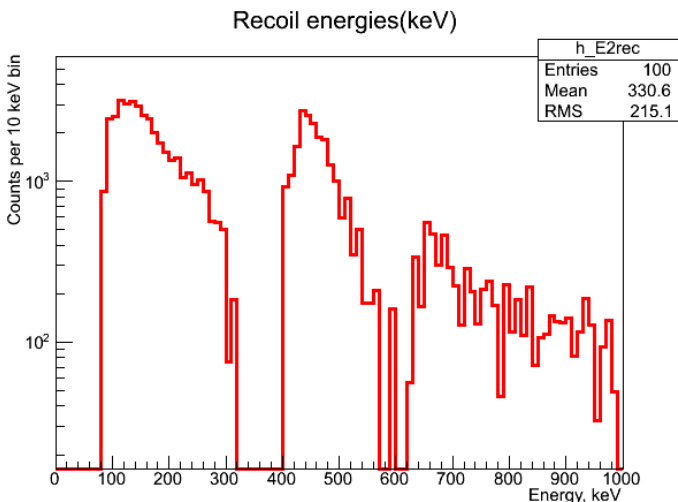
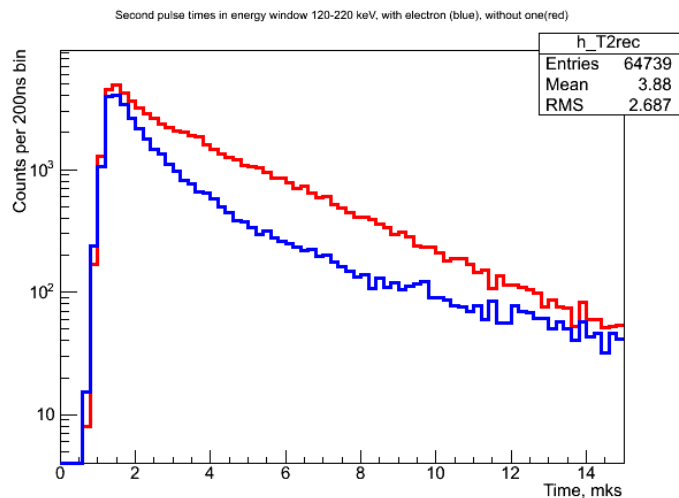
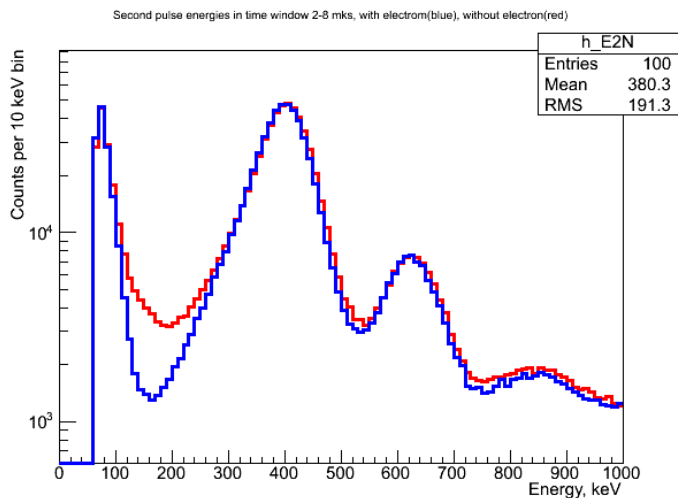


Decay electron times, eSC - μ SC.





Recoils in TPC, regular runs of run6.



$$\text{CN}_2 = 16.6 \pm 0.2 \text{ ppb}, \quad N_{e^-} = 0.15 \cdot 10^{10}, \quad \Lambda_c = 821 \pm 21 \text{ s}^{-1} \quad (\chi^2 = 415/227)$$

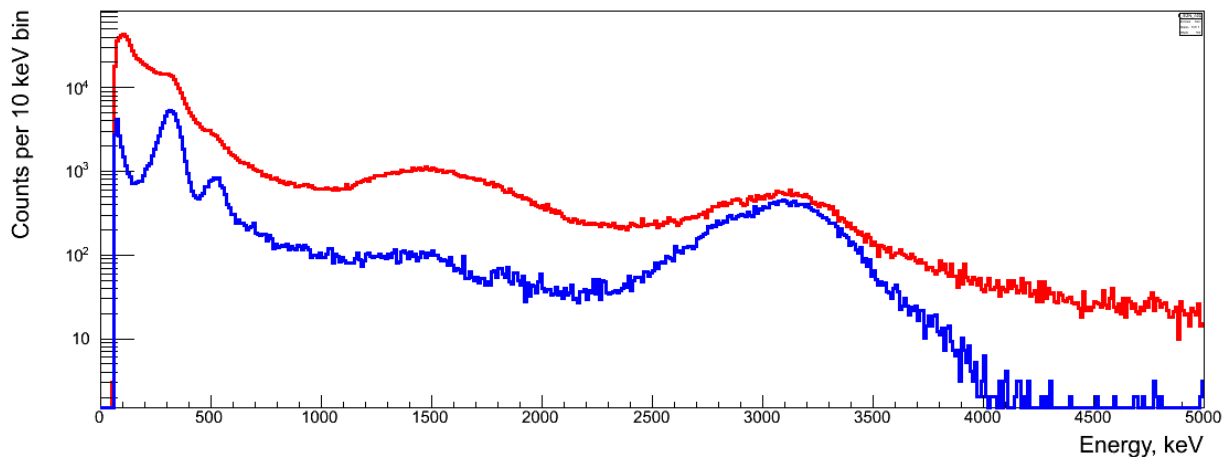
$$\text{CN}_2 = 17.1 \pm 0.3 \text{ ppb}, \quad N_{e^-} = 0.04 \cdot 10^{10}, \quad \Lambda_c = 851 \pm 40 \text{ s}^{-1} \quad (\chi^2 = 298/227)$$

$$\Delta\Lambda(N_2) = 3.87(2) \cdot 16.6(2) = 64(1) \text{ s}^{-1}$$

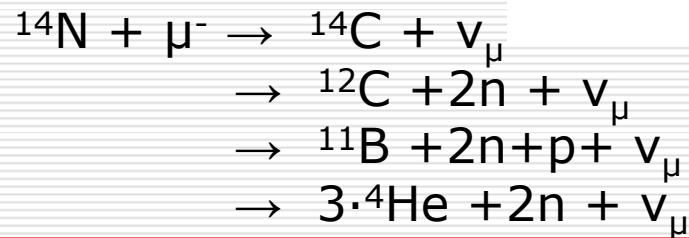
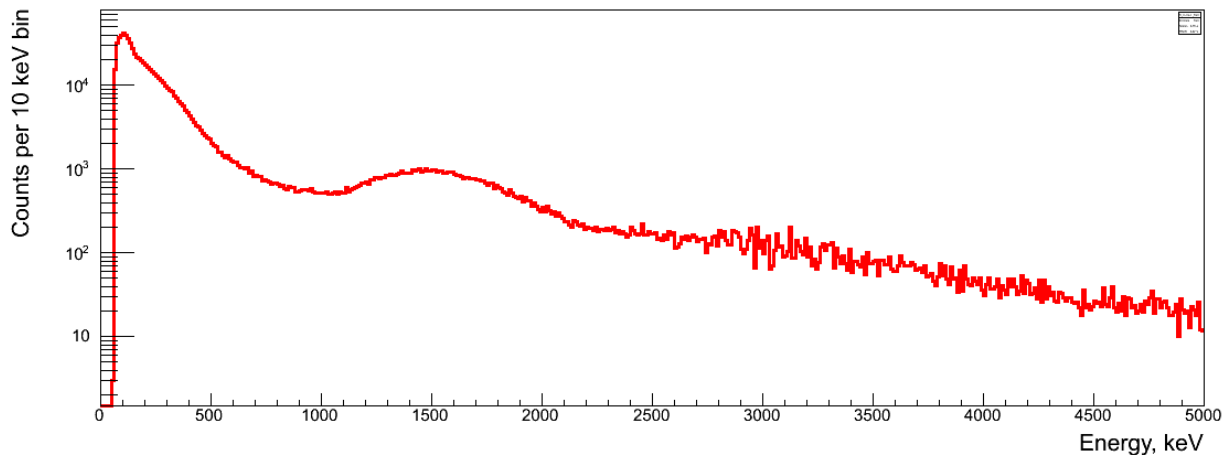


Recoil energies for N₂(1.85ppm) doped runs

Second pulse energy spectra with decay electron (upper curve) and without one (lower curve)



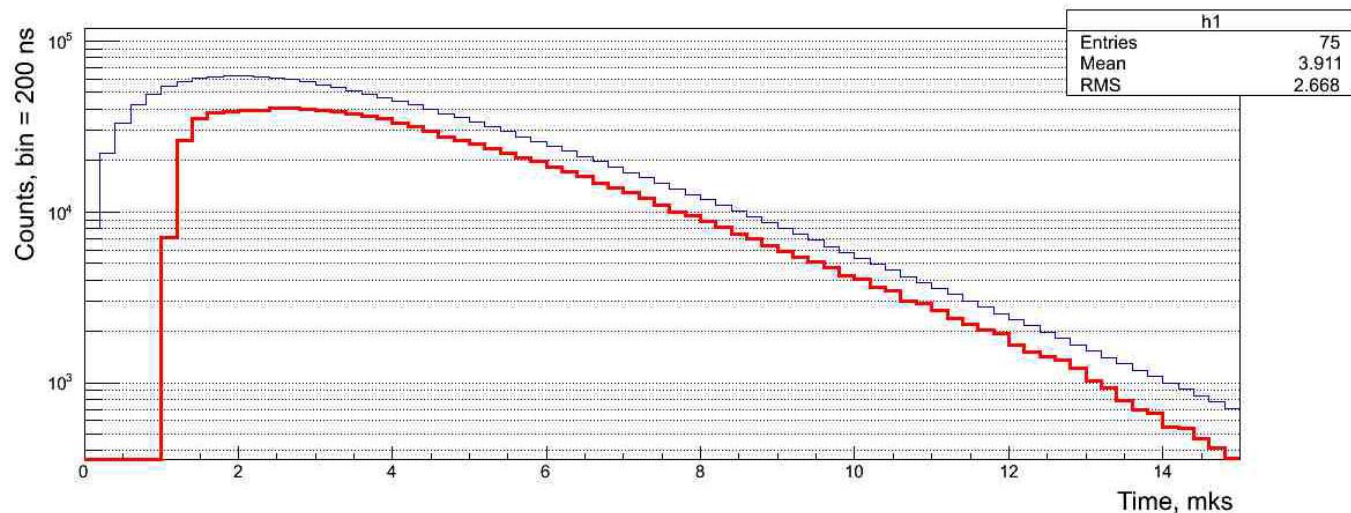
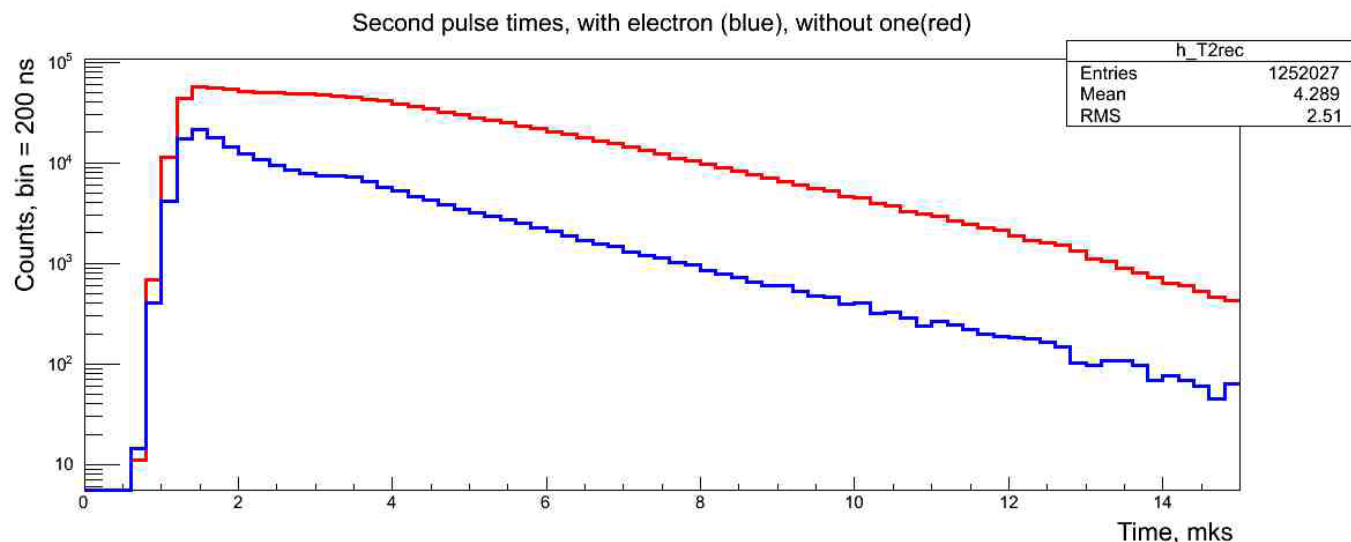
Energy spectrum of nitrogen capture products





Recoil times for N₂(1.85ppm) doped runs

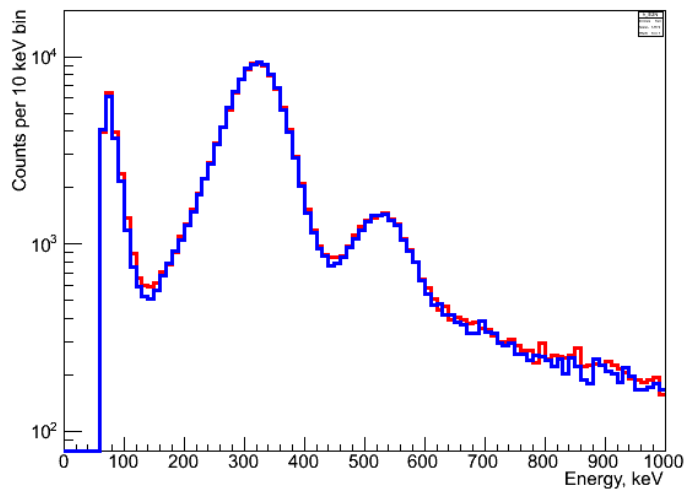
CN₂ = 1.85 · 10⁻⁶
λ_{dN} = 27 · 10⁴ s⁻¹
Λ_{cN} = 0.065 s⁻¹
Nμ = 207 · 10⁶
Regular MCF par.



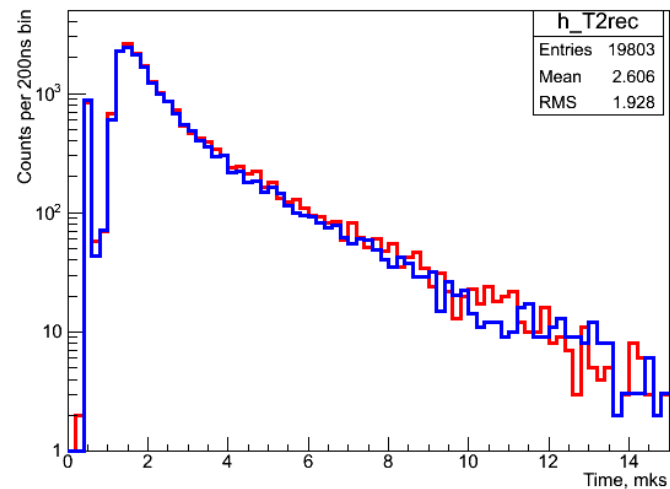


Pure deuterium runs

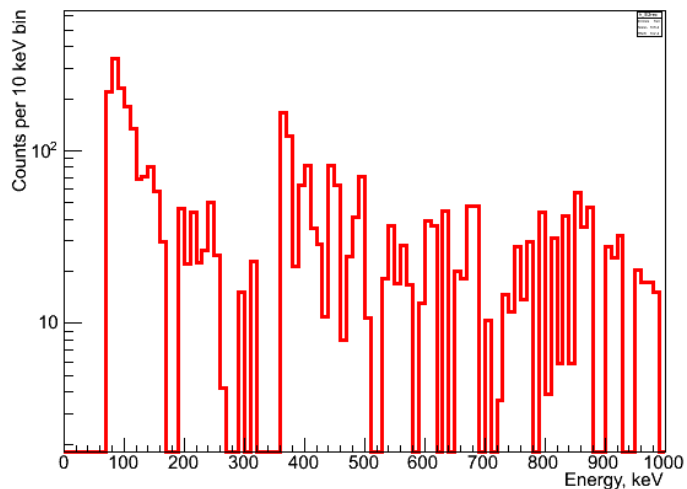
Second pulse energies in time window 2-8 mks, with electron(blue), without electron(red)



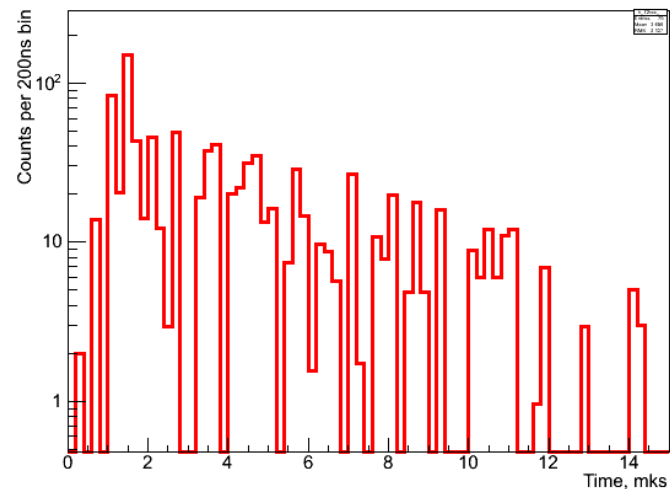
Second pulse times in energy window 120-220 keV, with electron (blue), without one(red)



Recoil energies(keV)



Recoil times (mks)



$CN_2 = 1.8 \pm 0.7$ ppb, $N_{e^-} = 0.037 \cdot 10^{10}$, $\Lambda_c = 870 \pm 41$ s $^{-1}$ ($\chi^2 = 313/227$)



CN2 versus time

Nitrogen concentration vs integrated run number

