

supernemo



Study of ^{214}Bi in source foils of SuperNEMO

2026/07/01 Collaboration meeting, Bratislava

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cnrs

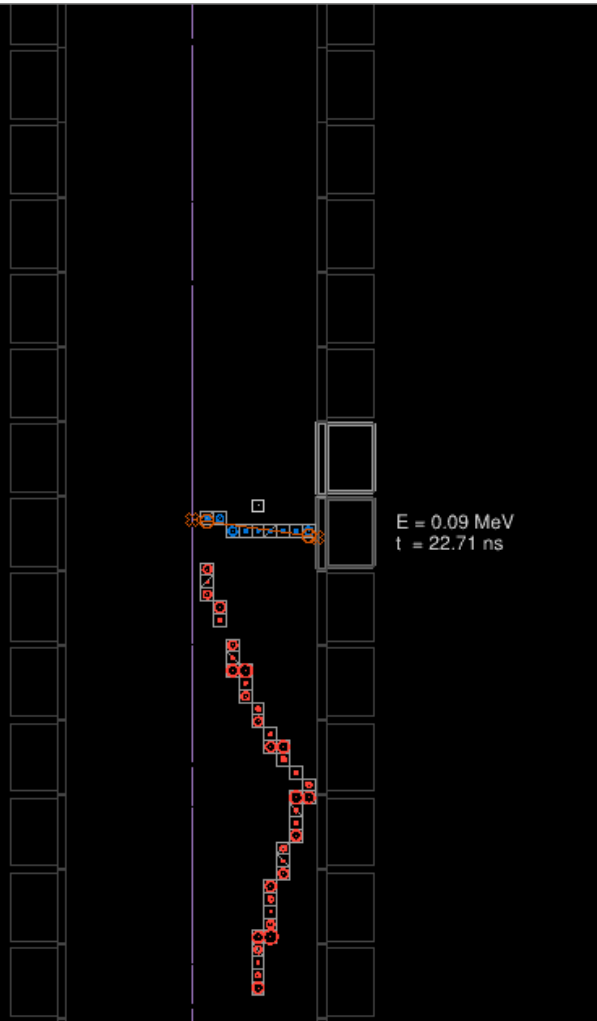


Electron n gamma selection

- Motivation : To measure the ^{214}Bi internal contamination with a more powerful channel
- Selection criteria :
Looking for electrons (tracks with OM associated) → Source foils vertex !
- No particles nearby : min 3D distance > 30 cm or > 20 cm in (x,y) plane (to avoid bad z reconstruction)
- Gamma TOF selection

Electron n gamma selection

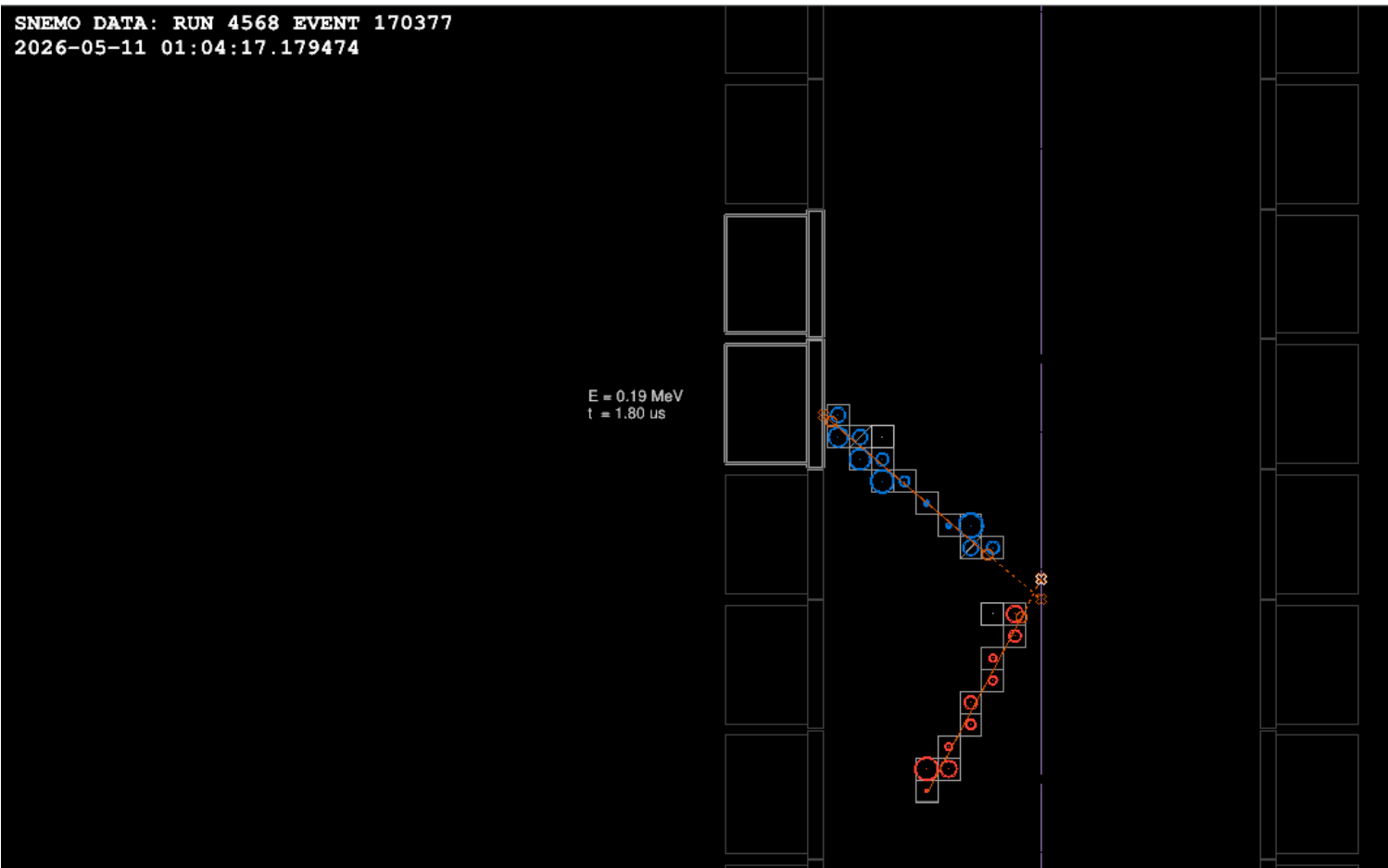
SNEMO DATA: RUN 4568 EVENT 38378
2026-05-10 19:38:50.220885



Unfitted cluster near
the electron



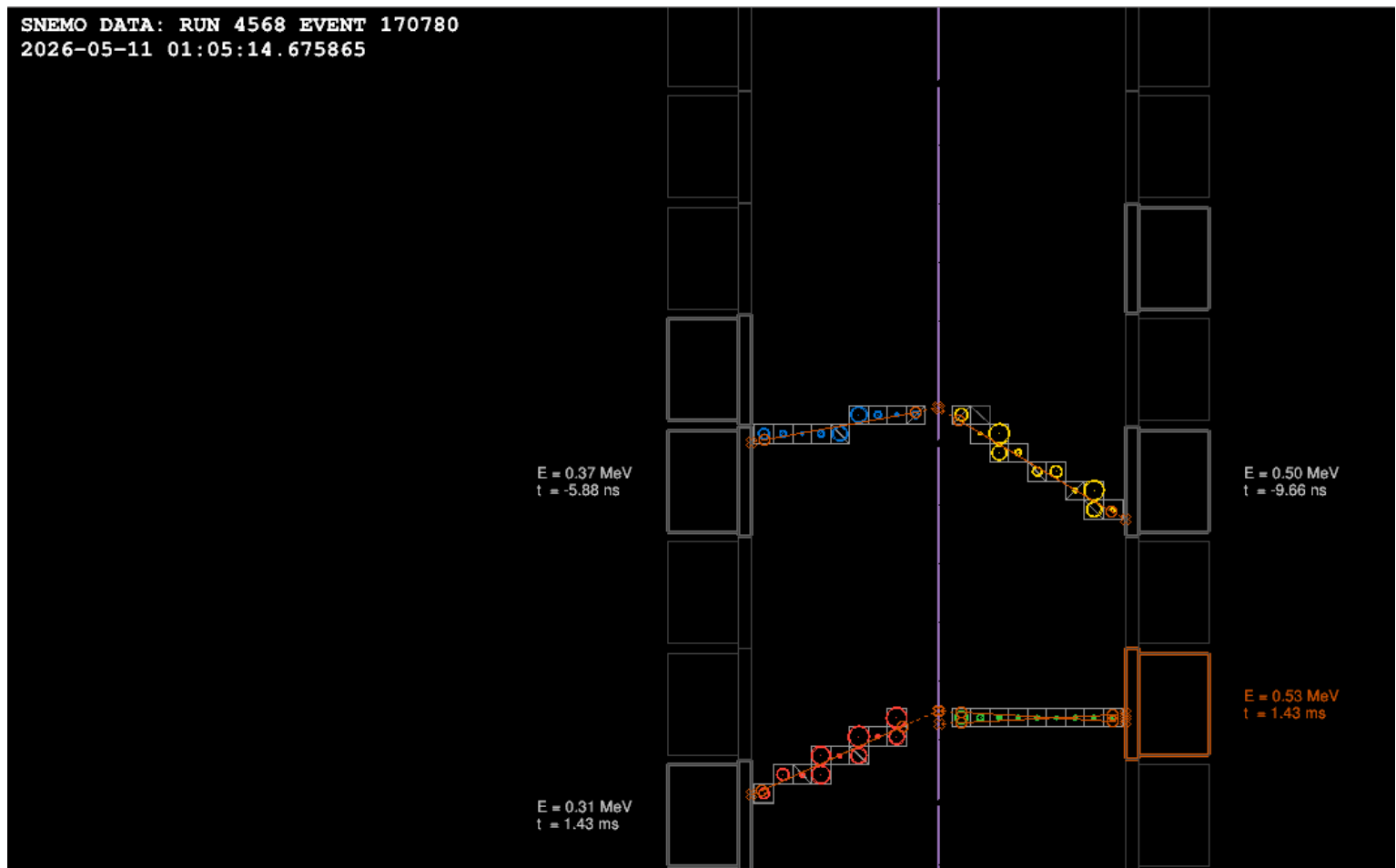
Electron n gamma selection



Alpha like near the
electron



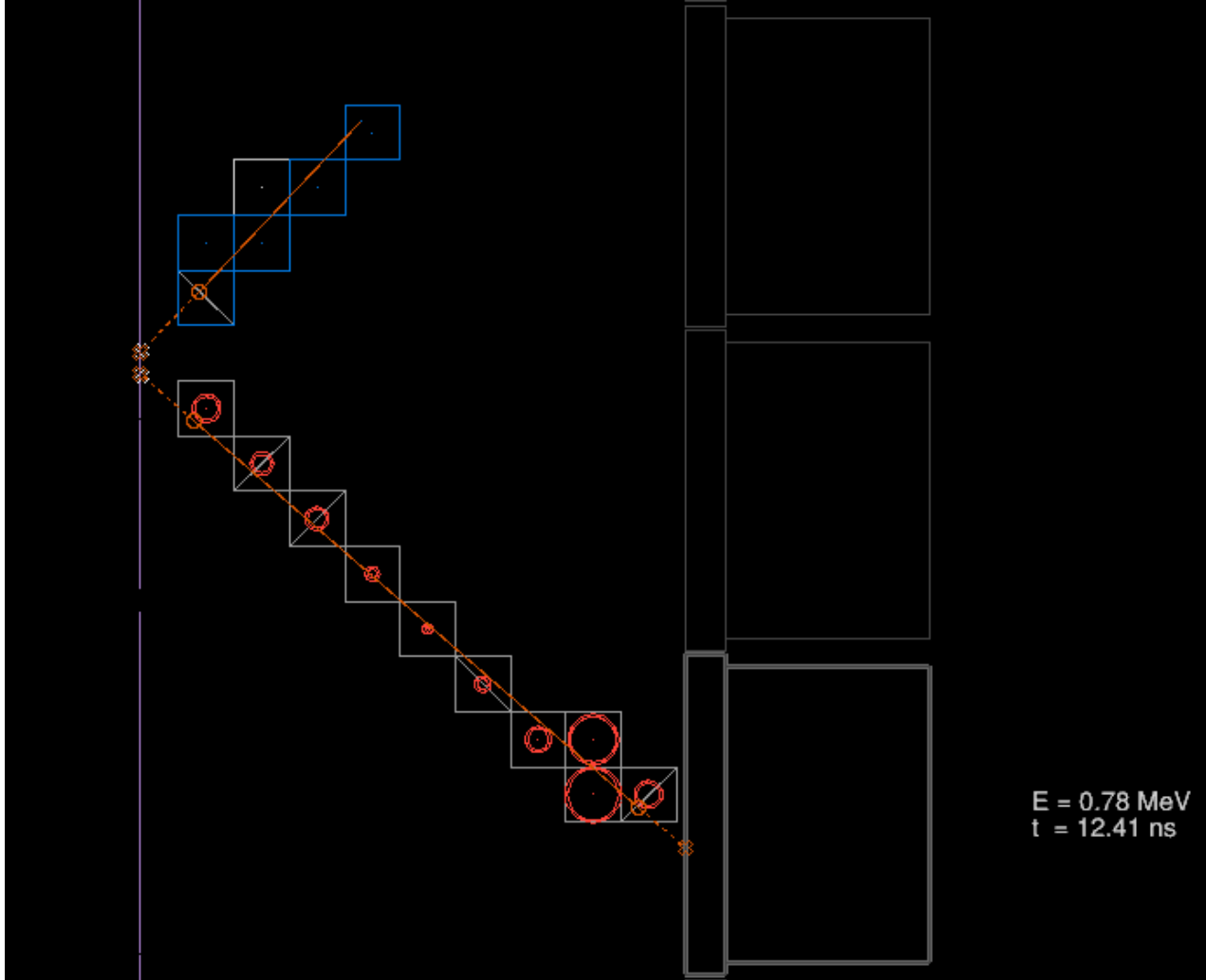
Electron n gamma selection



Electrons near by
electron



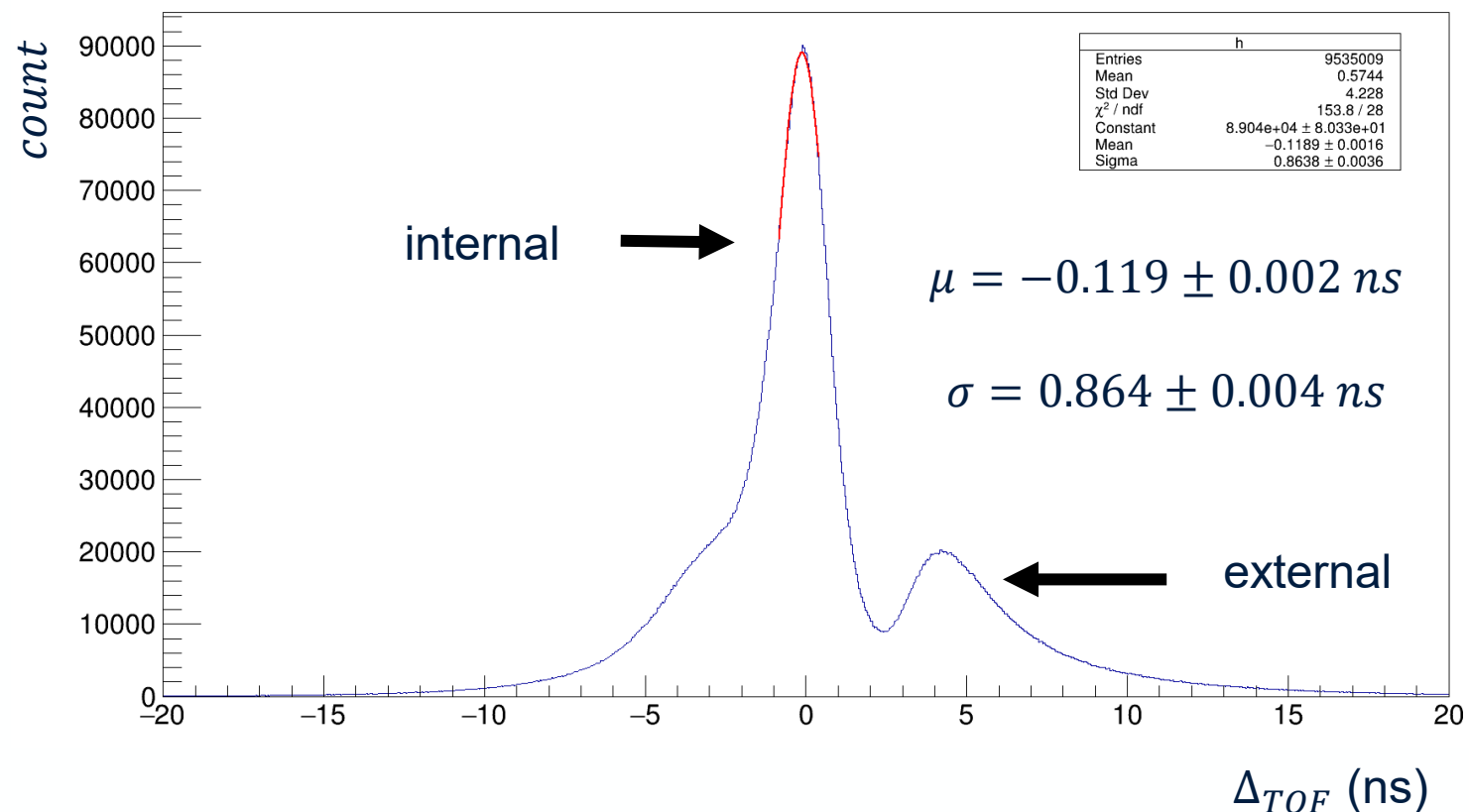
Electron n gamma selection



BiPo event selected by
Rn analysis



Gamma Time Of Flight



Time difference between γ & e^- :

$$\Delta t_{exp} = t_{e^-} - t_{\gamma}$$

Compute e^- and γ TOF based on time & track length

$$\Delta t_{th} = t_{th e^-} - t_{th \gamma}$$

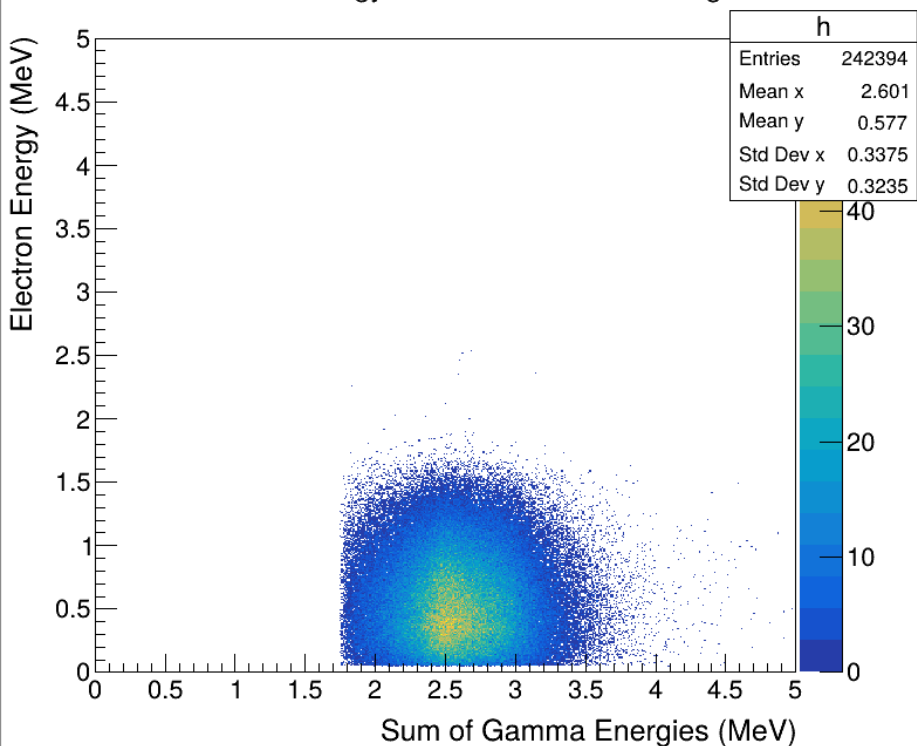
$$\Delta_{TOF} = \Delta t_{exp} - \Delta t_{th} \sim 0 \text{ ns}$$

^{208}Tl & ^{214}Bi selection

^{214}Bi & ^{208}Tl selection with 2 gamma & $E_{\gamma}^{max} \geq 1.7 \text{ MeV}$

MC ^{208}Tl Bulk

Electron Energy vs Sum of Gamma Energies

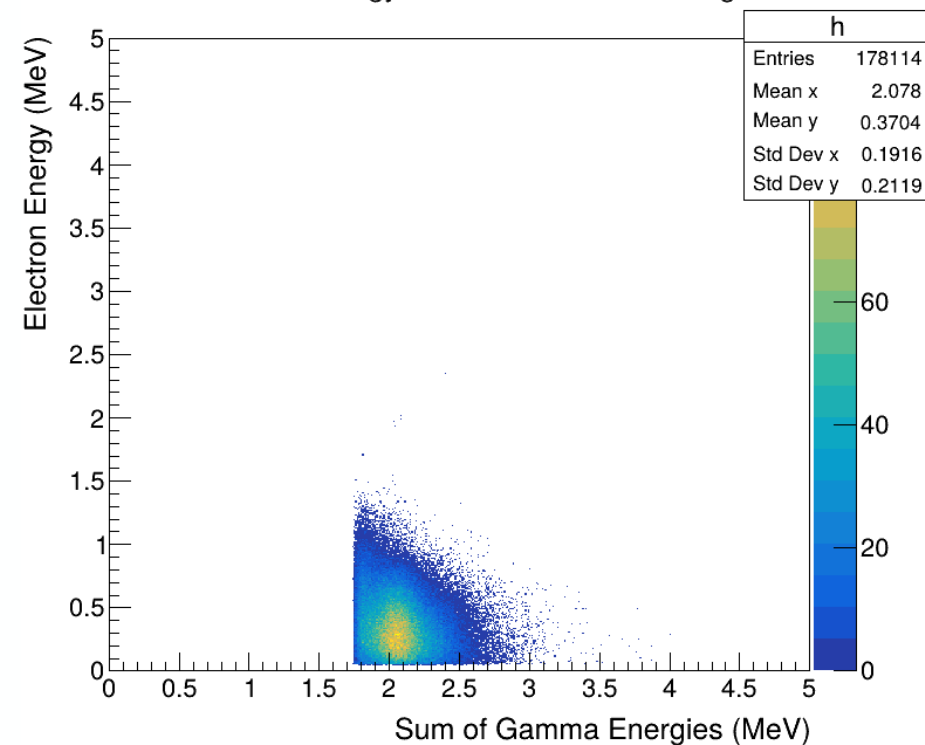


Can separate both contribution !



MC ^{214}Bi Bulk

Electron Energy vs Sum of Gamma Energies

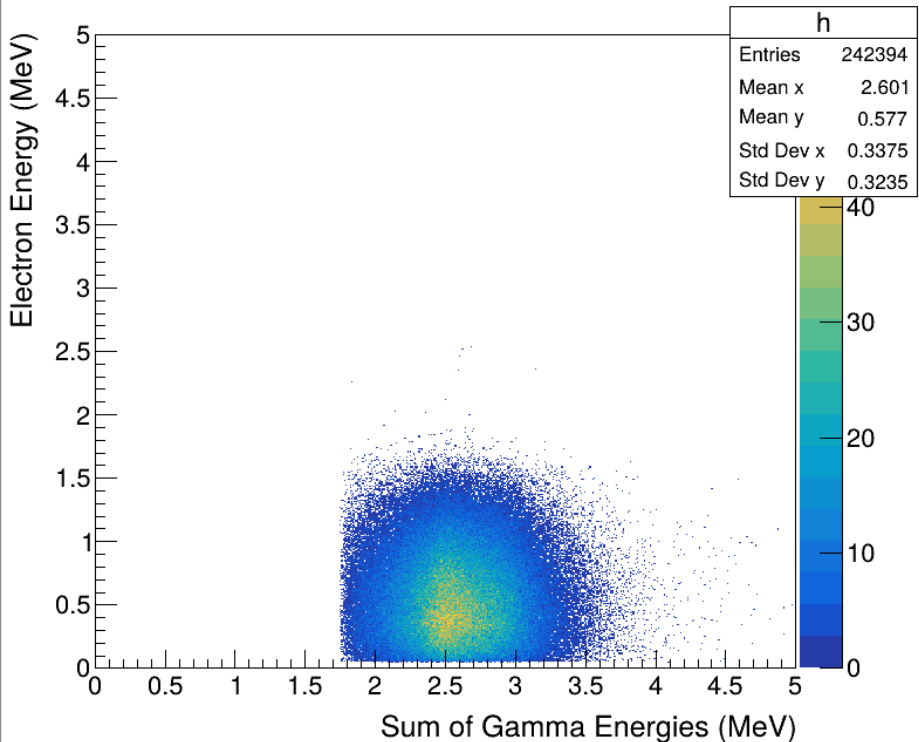


208Tl & 214Bi selection

214Bi & 208Tl selection with 2 gamma & $E_{\gamma}^{max} \geq 1.7 \text{ MeV}$

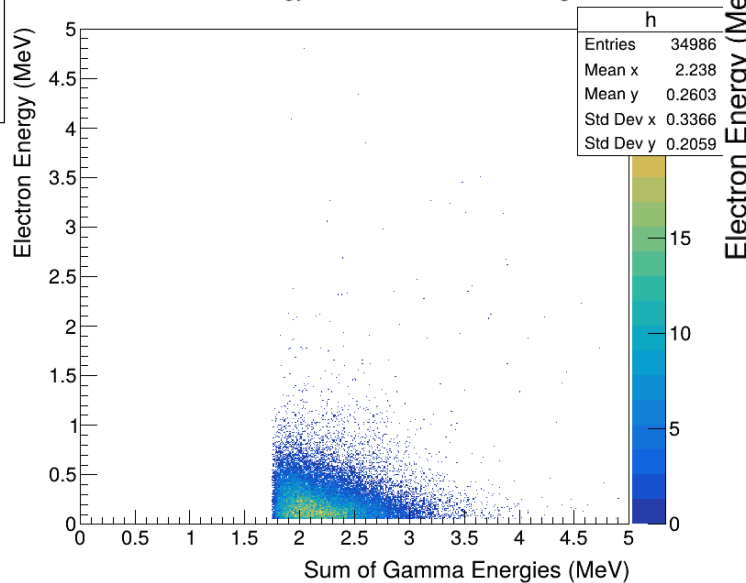
MC 208Tl Bulk

Electron Energy vs Sum of Gamma Energies



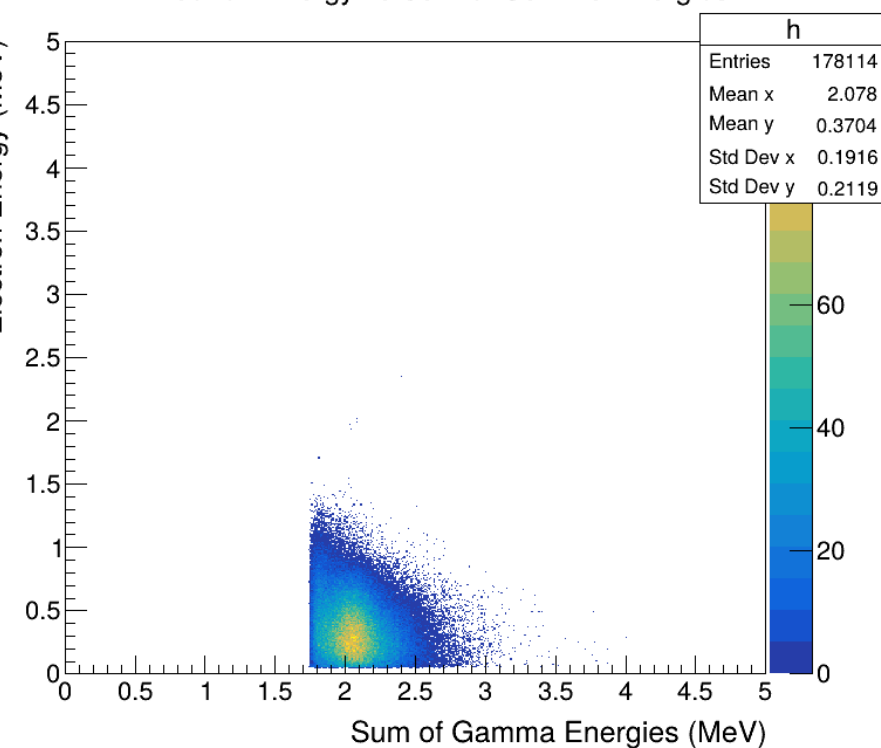
All data

Electron Energy vs Sum of Gamma Energies



MC 214Bi Bulk

Electron Energy vs Sum of Gamma Energies



- We can identify & separate ^{214}Bi & ^{208}Tl contribution
- Need to perform simulation with good vertex (still have the bug, see my next talk on source foils vertex generator bug)
- Preliminary result on ^{214}Bi & ^{208}Tl internal contamination of foils with $(e, 2\gamma)_{\text{int}}$ analysis
- Have to check why I gave only low electron energy on data

Thank you !

