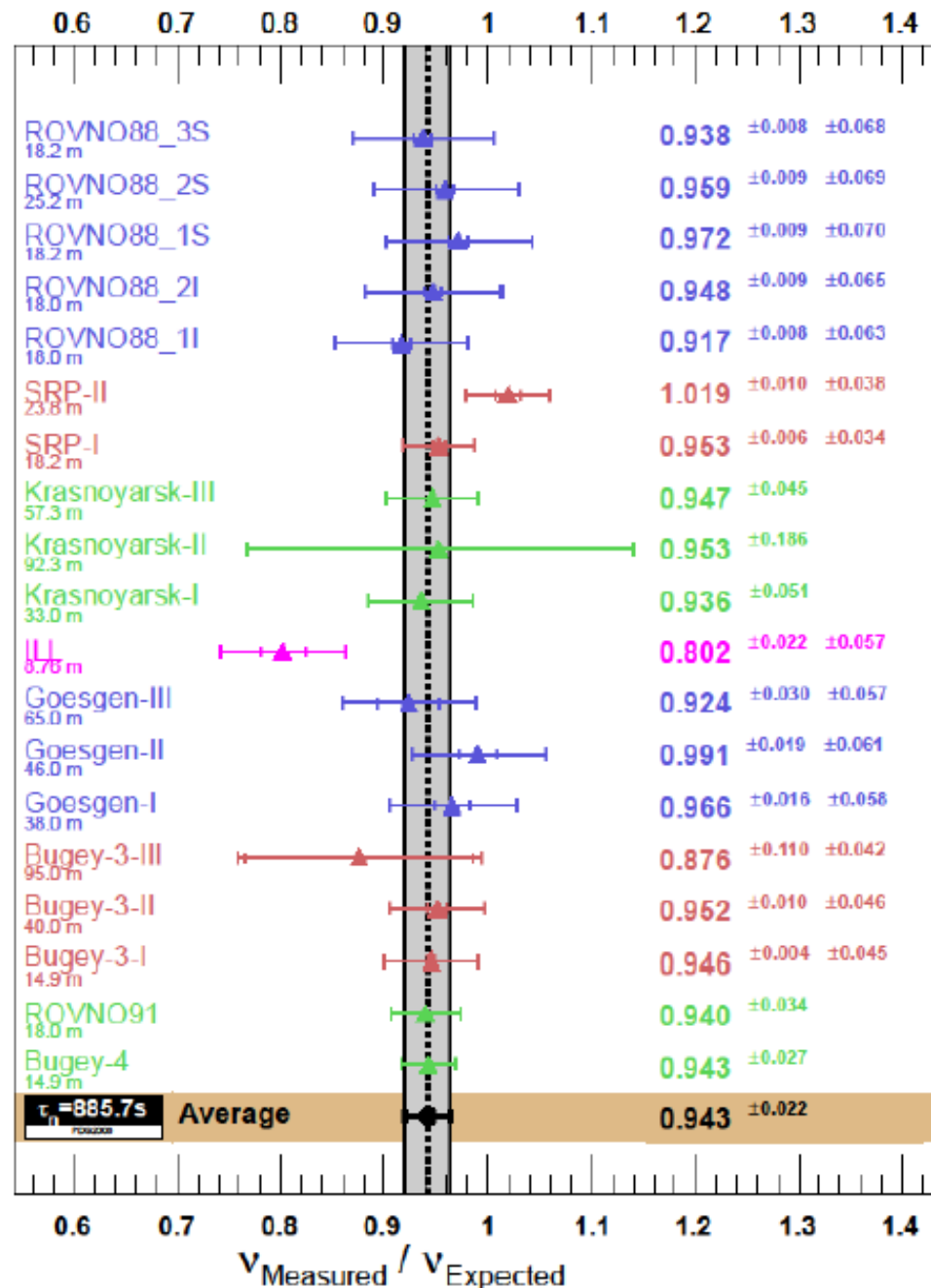


Summary & Outlook

- **Non-accelerator neutrino experiments** (atmospheric, solar, reactor) are now doing **precision measurements**: test of sub-leading terms θ_{13} , θ_{14} , NSI,...
- **Hint for $\theta_{13} > 0$** from non-accelerator experiments together with recent results from T2K & Minos are now at **3σ C.L.**
- **θ_{13} search** with **Double Chooz** started in April 2011, statistics in 2011 expected to be sufficient to verify central value of T2K; Reno, Daya Bay coming soon online.
- Does the **reactor anomaly** (together with other 2.5σ anomalies) point to **sterile neutrino(s)**? Experimental tests required!
- **2011: GERDA & EXO-200 started, soon KL-Zen, Cuore-0** will start search for **$0\nu\beta\beta$ decay**
- **2012: expect a plethora of interesting results on θ_{13} and $0\nu\beta\beta$, and more!**

Implications for SBL reactor experiments: reactor neutrino anomaly



- **Best fit : 0.943 ± 0.023** ($\chi^2 = 19.6/19$)

- Deviation from unity (2.5σ)
(Full treatment of correlations)

- **Wrong predictions of ν -spectra?**

- **Bias in all SBL reactor experiments?**

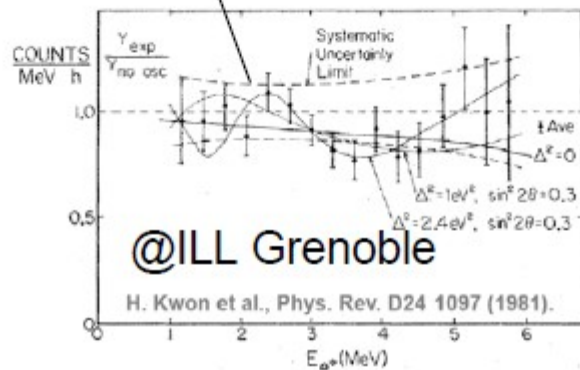
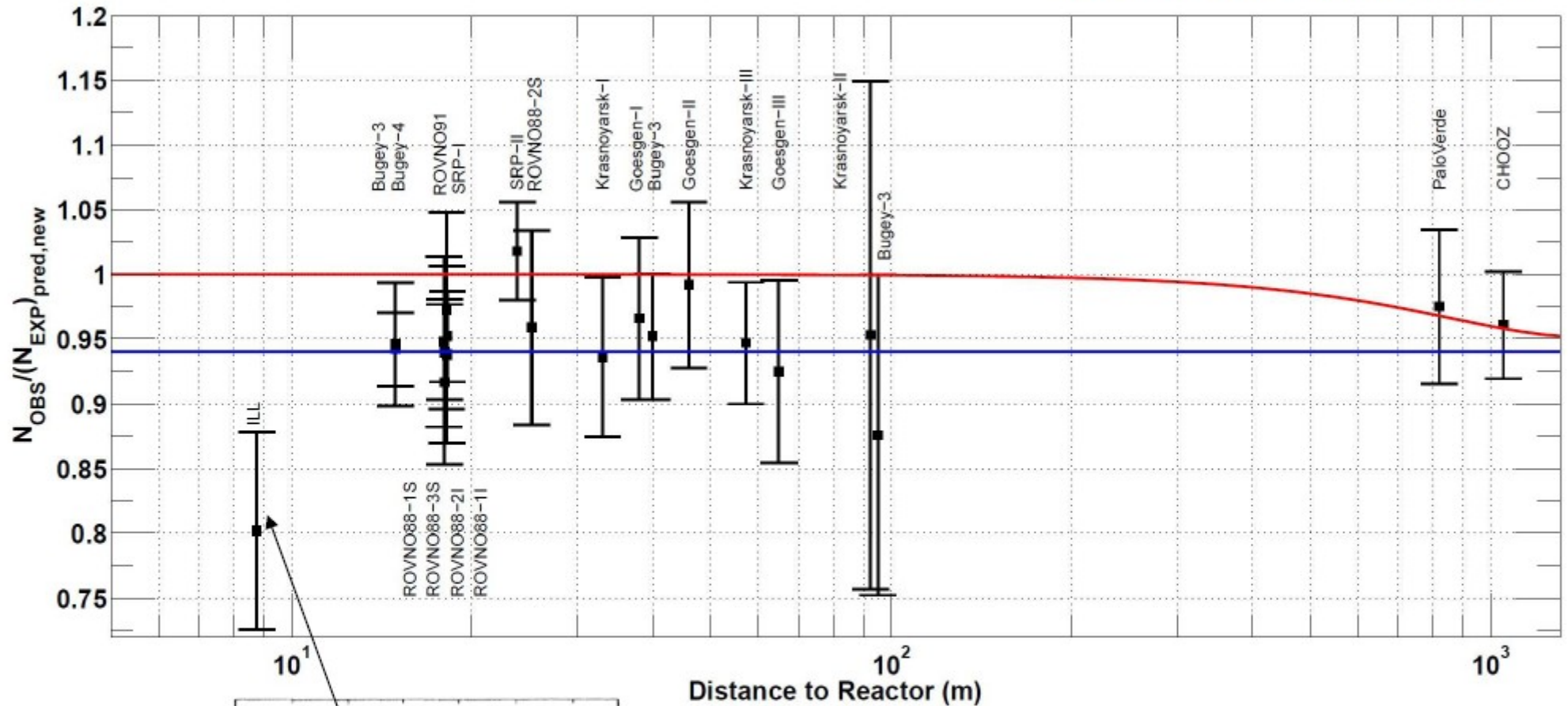
- **Hint for new physics at VSBL?**

- Mixing with 4th sterile ν :
 θ_{new} and Δm_{new}^2

- (N.B.: also corroborated by Gallium source measurements)

Implications for SBL reactor experiments: reactor neutrino anomaly

G. Mention et al. arXiv:1101.2755v4



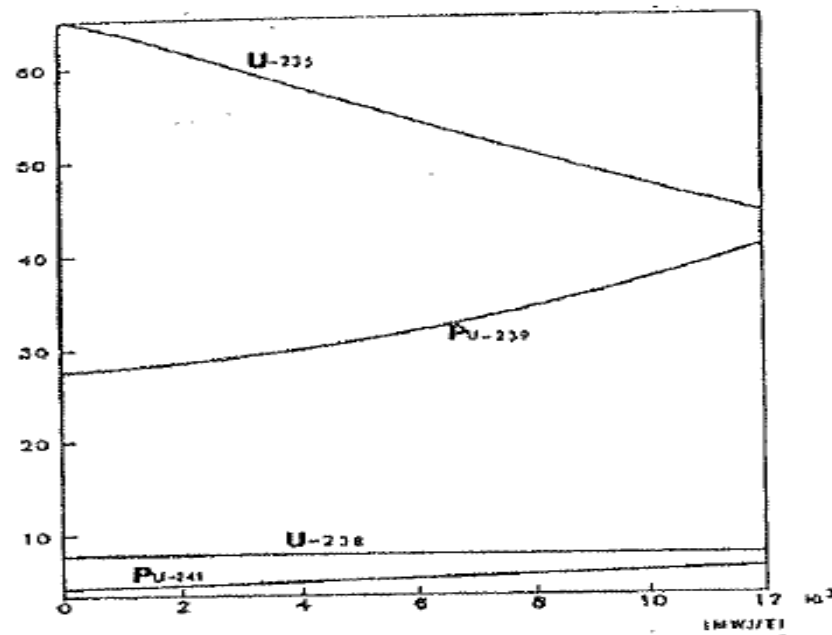
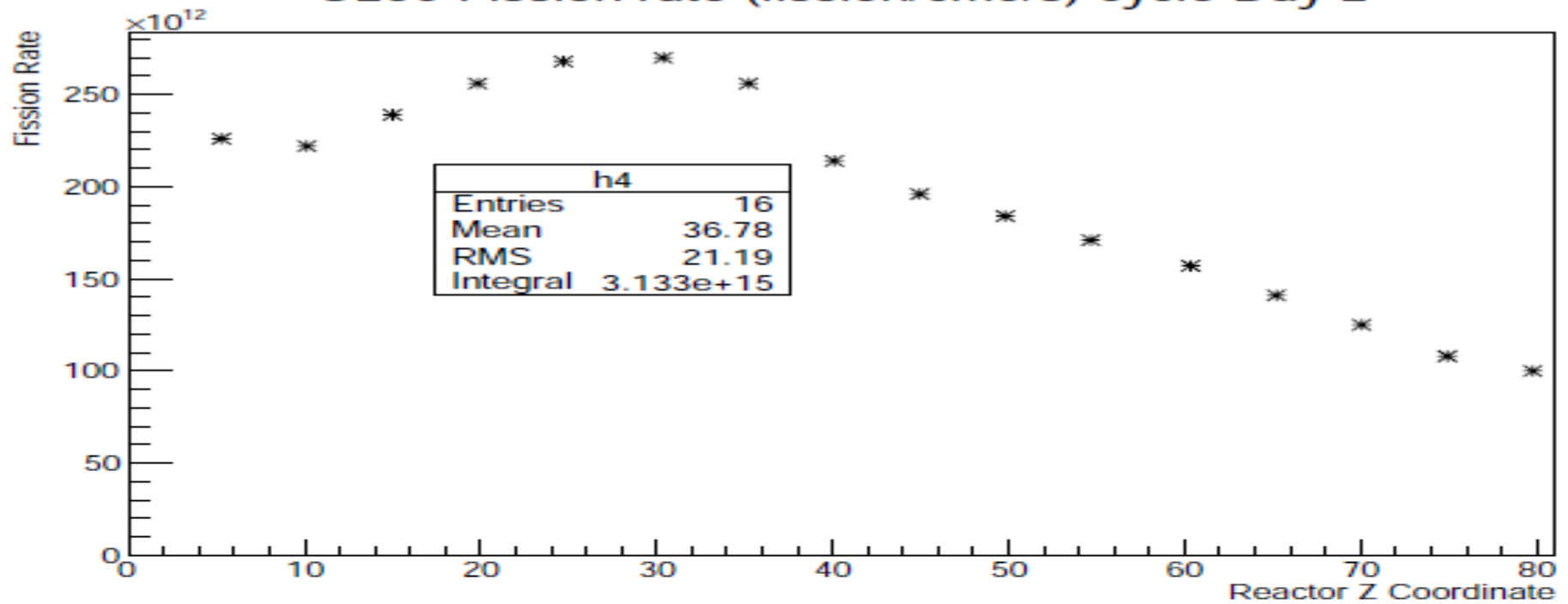


Fig 4.2 : Evolution de la contribution des différents noyaux fissiles à la production d'énergie en fonction du temps.

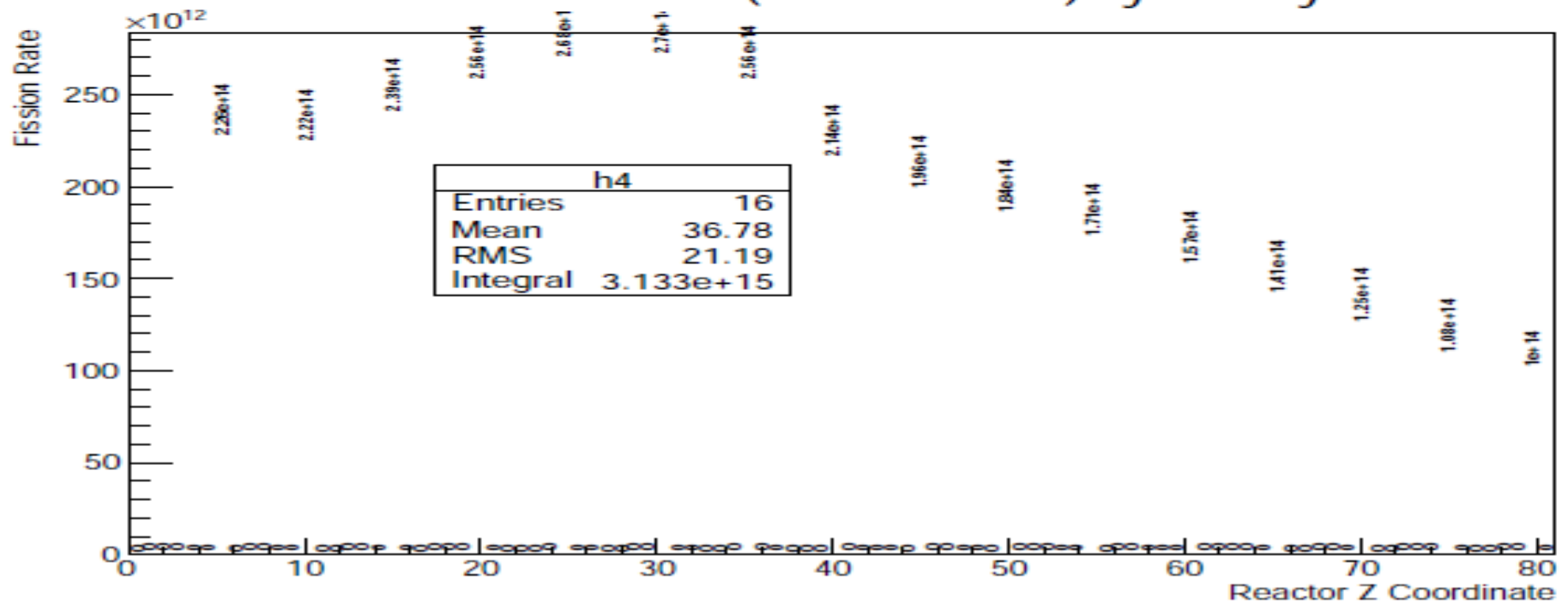
	Réacteur du Bugey (réf 4.1)	Réacteur de l'ILL (Réf 4.4)	Réacteur de Gösgen (Réf 4.2)
Eléments fissiles présents au début de chaque cycle de fonctionnement du réacteur.	^{238}U ^{235}U ^{239}Pu ^{241}Pu $\langle E_f \rangle = 200 \text{ Mev}$	^{235}U $\langle E_f \rangle = 199 \text{ Mev}$	^{238}U ^{235}U ^{239}Pu ^{241}Pu $\langle E_f \rangle = 204 \text{ Mev}$
Energie thermique en (MW).	2785	57	2800
Flux antineutrino issu du réacteur : ϕ_0 ($\bar{\nu}_e / \text{s}$)	$5.24 \cdot 10^{20}$ (6 $\bar{\nu}_e$ /fission)	$9.5 \cdot 10^{18}$ (5.3 $\bar{\nu}_e$ /fission)	$5.151 \cdot 10^{20}$ (6 $\bar{\nu}_e$ /fission)
Nombre de fissions par seconde	$0.87 \cdot 10^{20}$	$1.79 \cdot 10^{18}$	$0.83 \cdot 10^{20}$

Tableau 4.3 : Quelques caractéristiques des réacteurs nucléaires du Bugey, de Gösgen et de l'ILL.

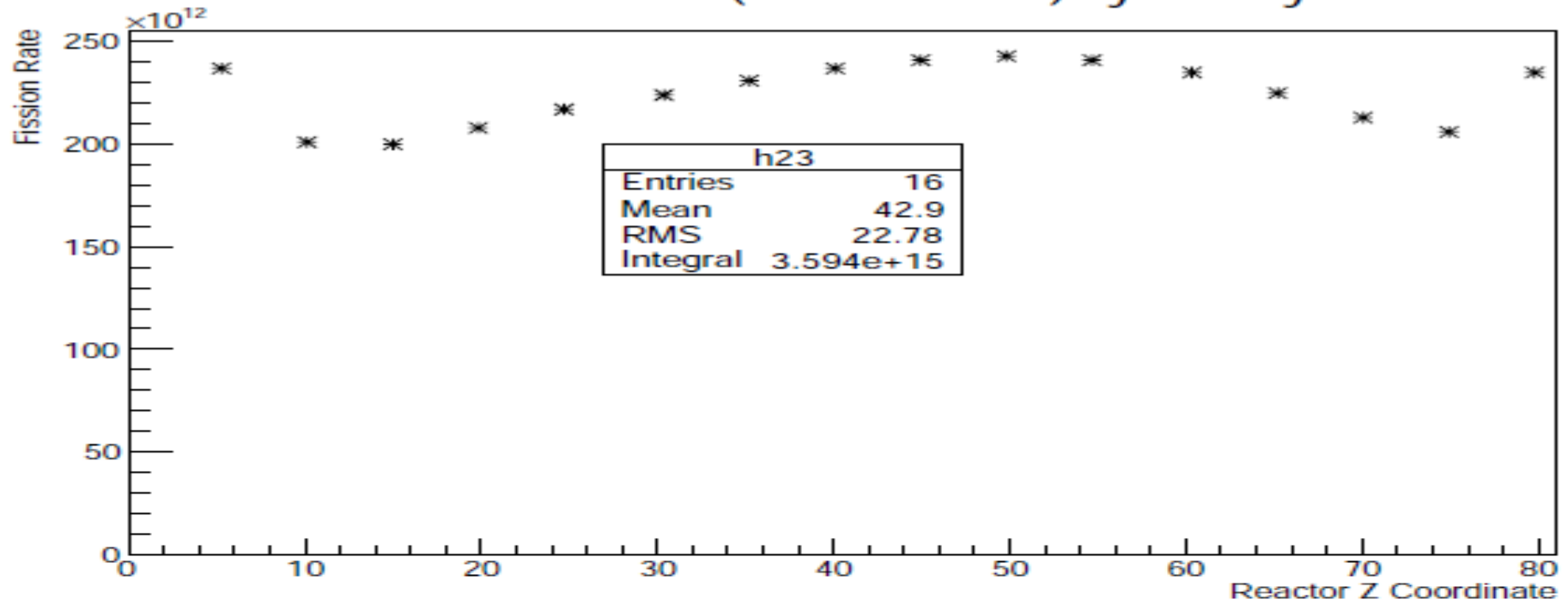
U235 Fission rate (fission/cm3/s) cycle Day 2



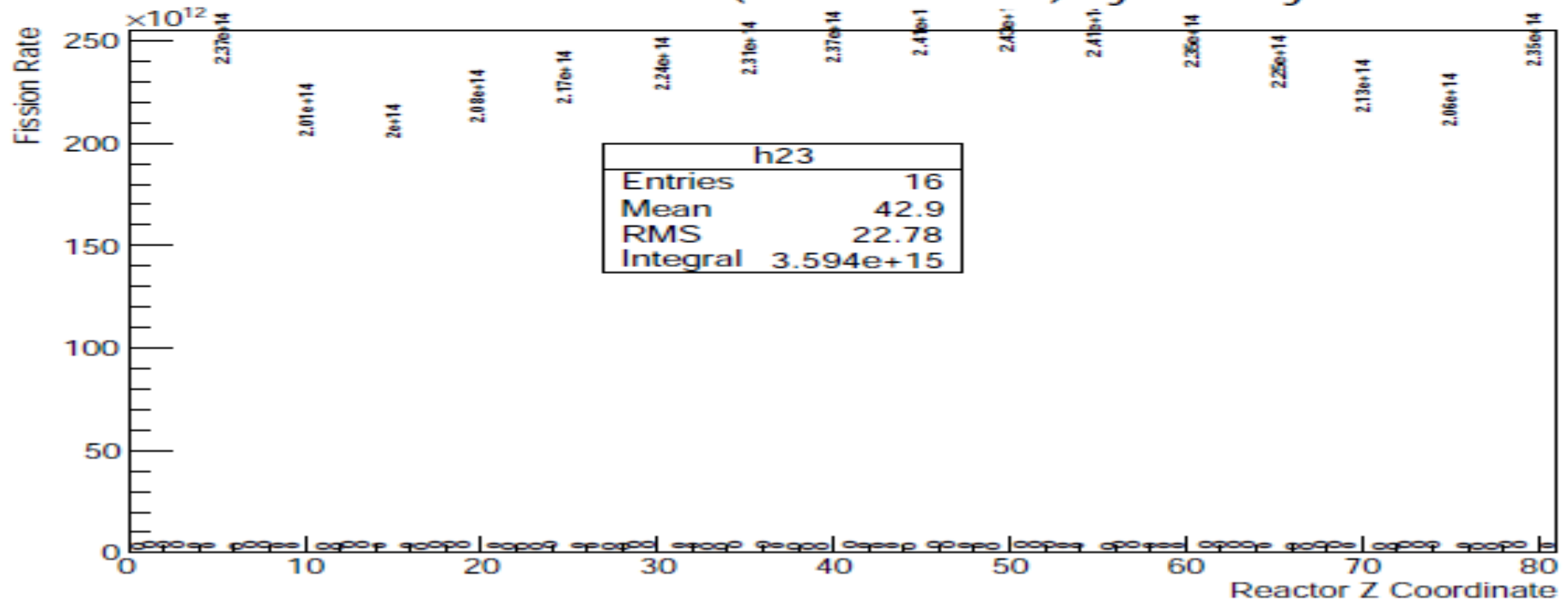
U235 Fission rate (fission/cm3/s) cycle Day 2



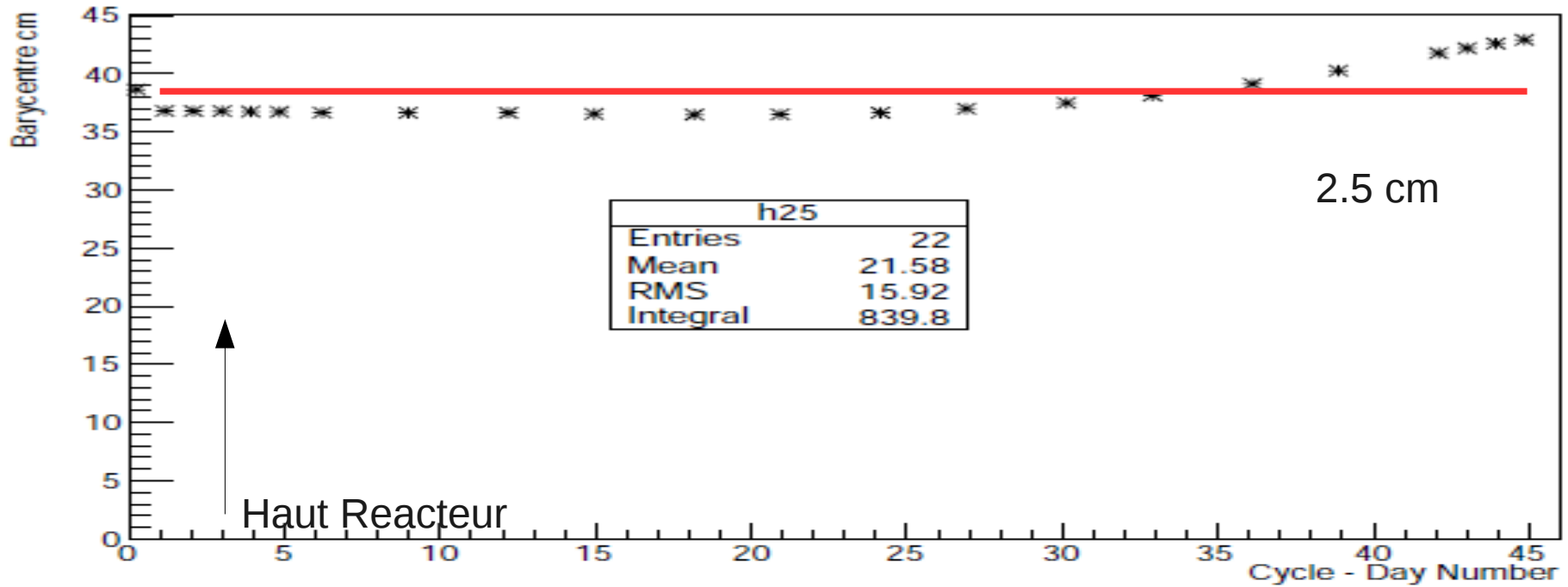
U235 Fission rate (fission/cm3/s) cycle Day 45



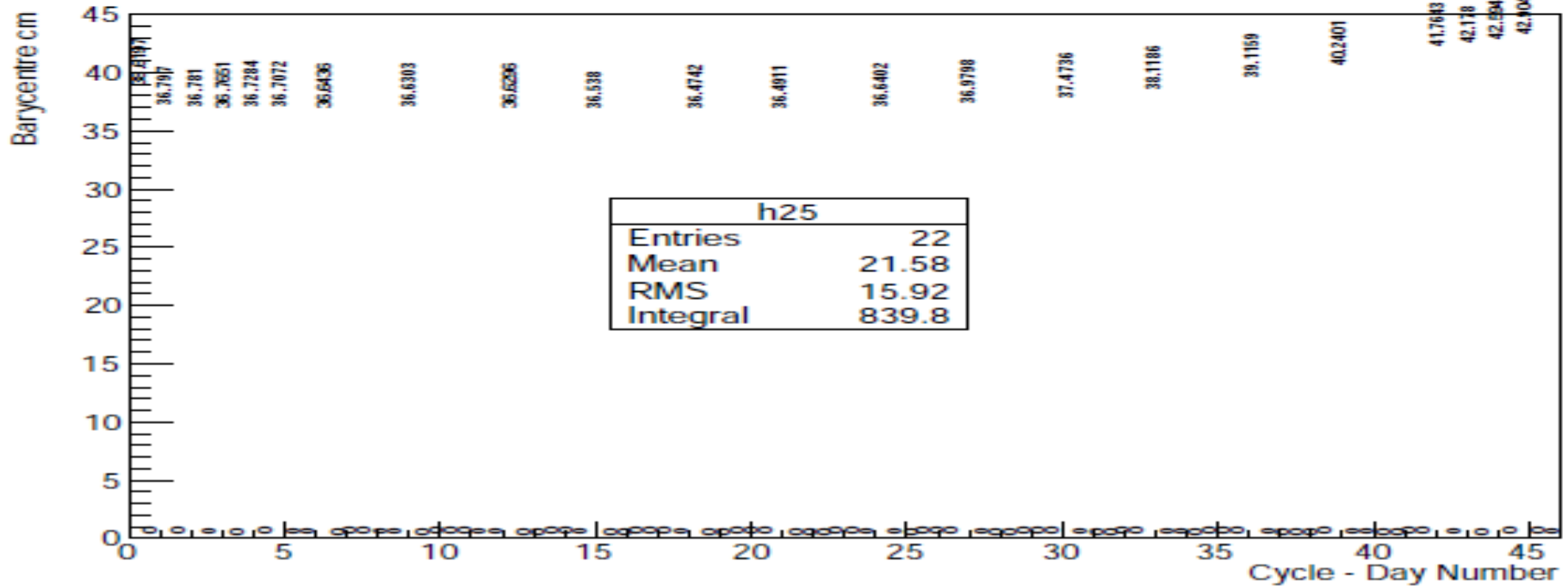
U235 Fission rate (fission/cm3/s) cycle Day 45



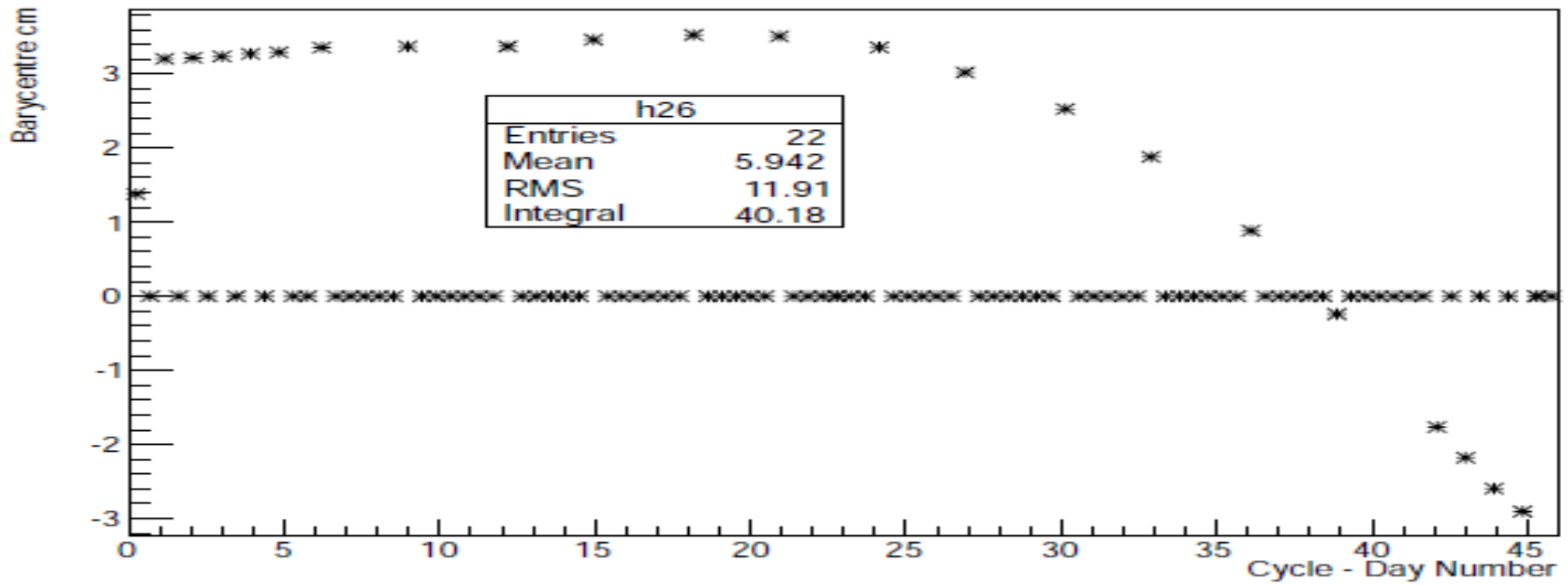
Mean Value of Z Barycentre fission



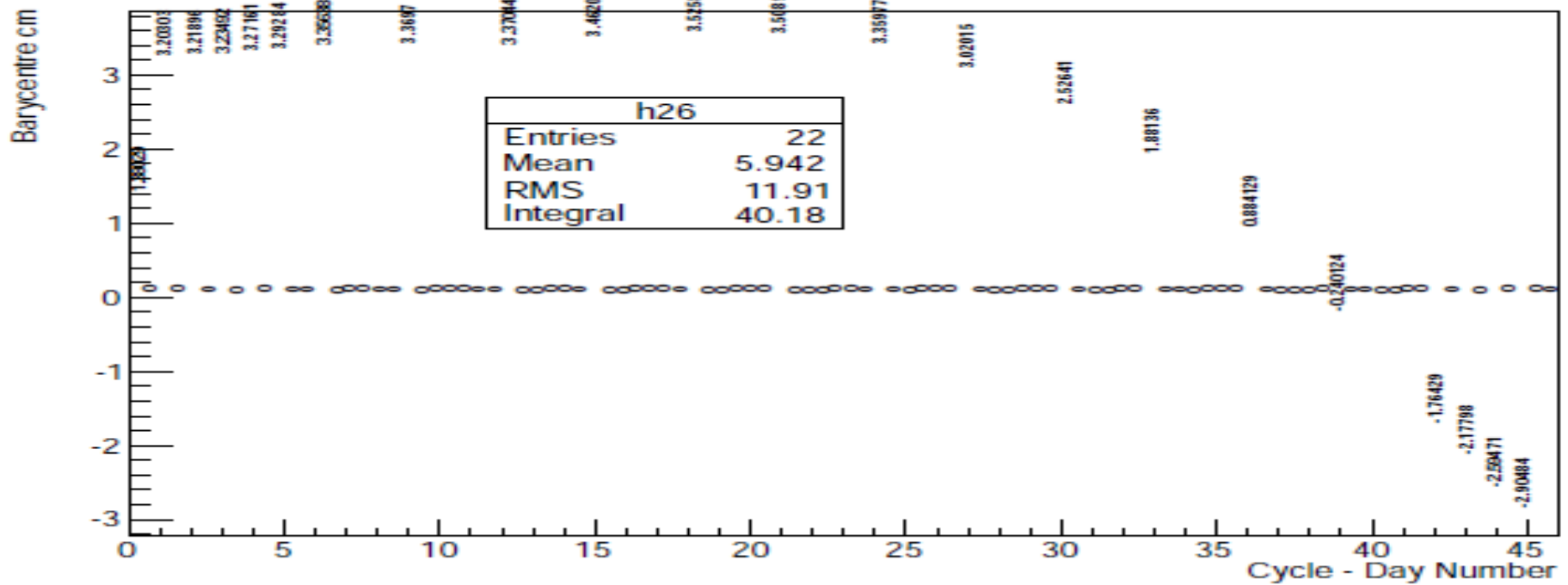
Mean Value of Z Barycentre fission



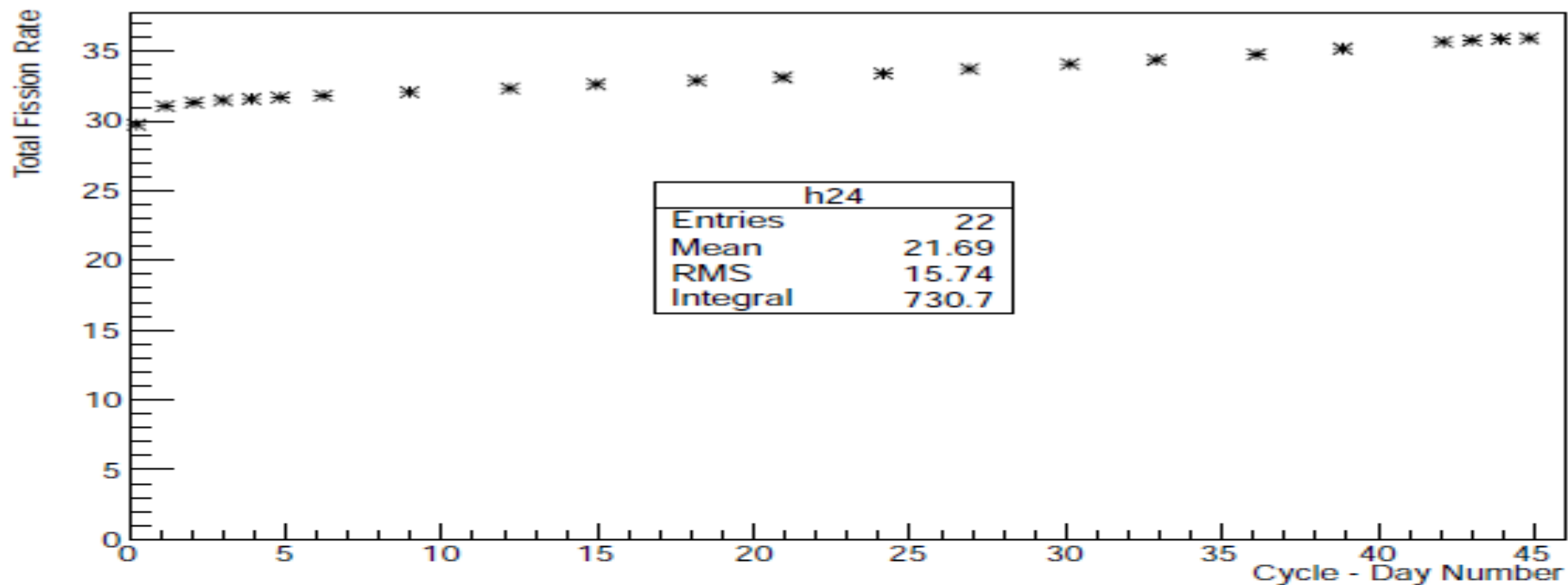
Ecart Z Barycentre fission



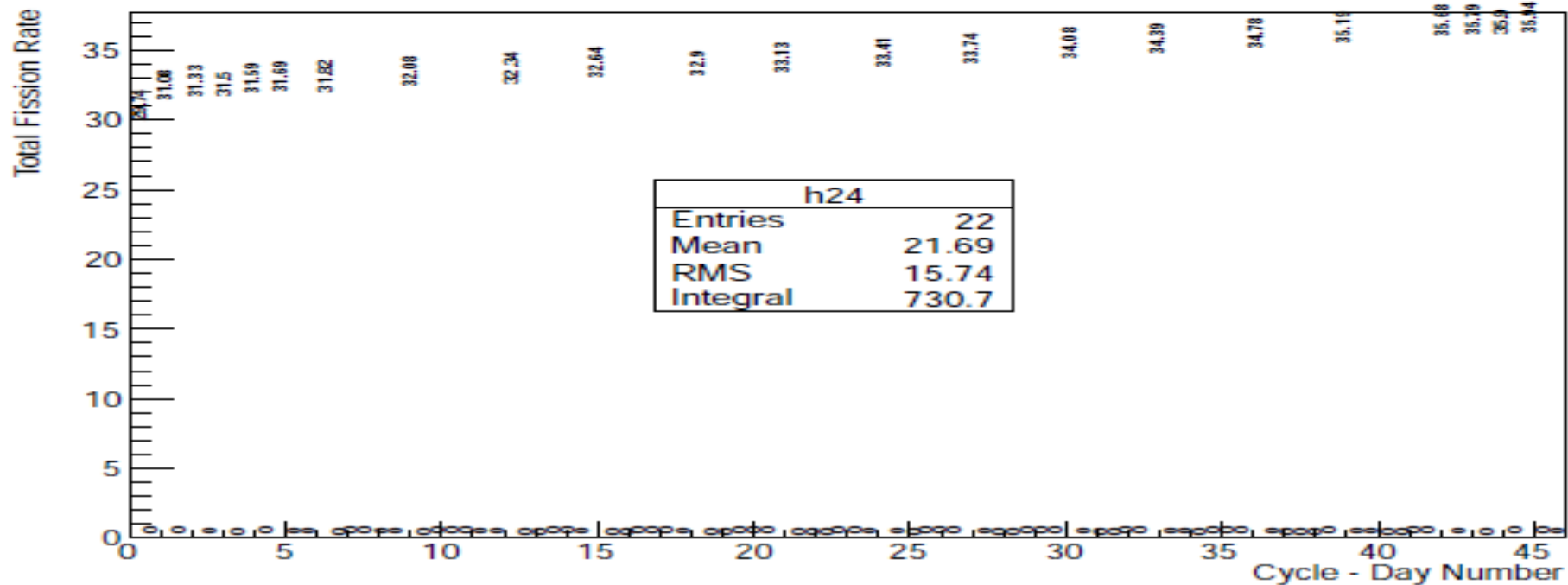
Ecart Z Barycentre fission



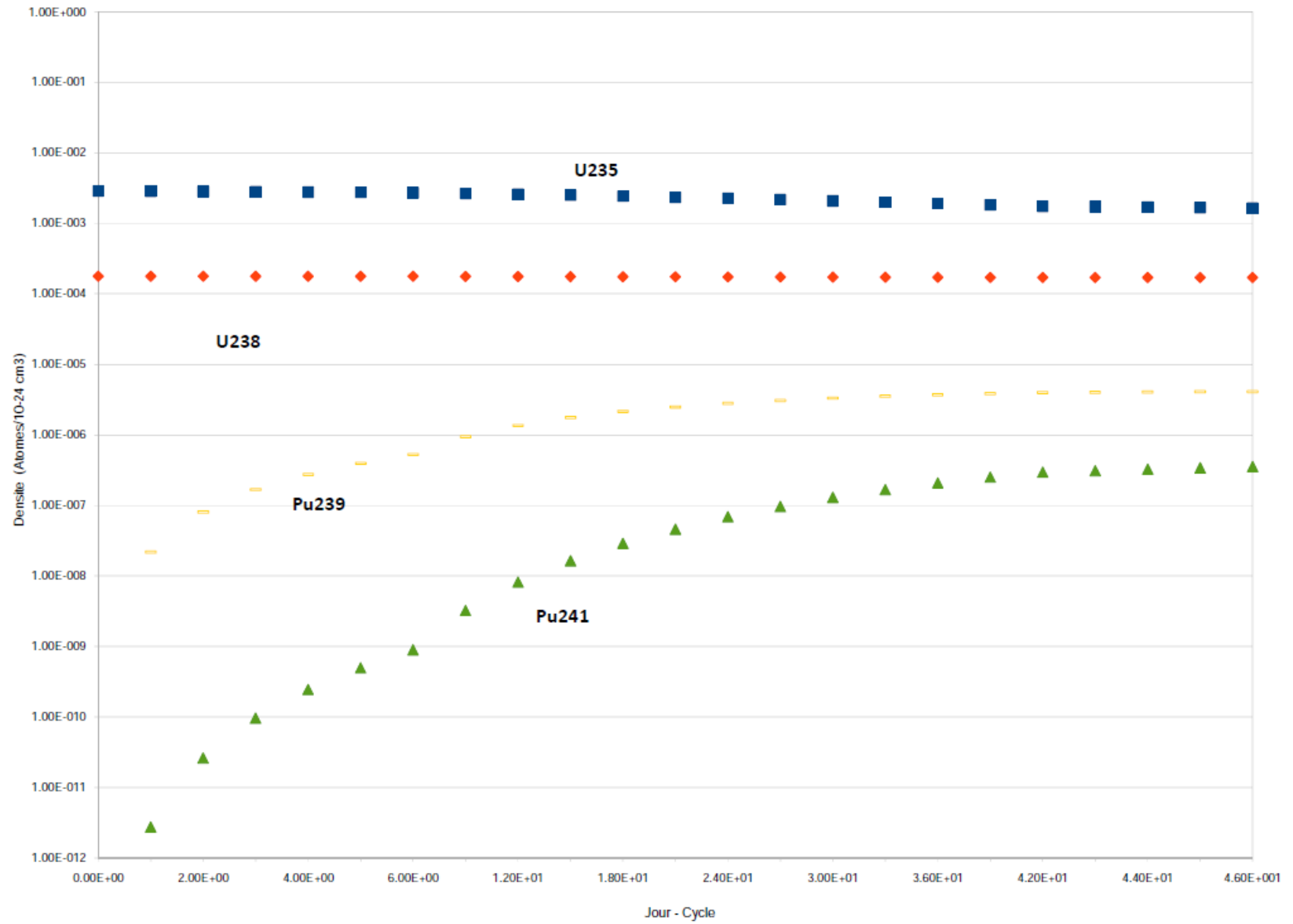
Total Fissions /cm3/s



Total Fissions /cm3/s



Burn up



Burn up

