

First fit of nTMM data from Sept 2025

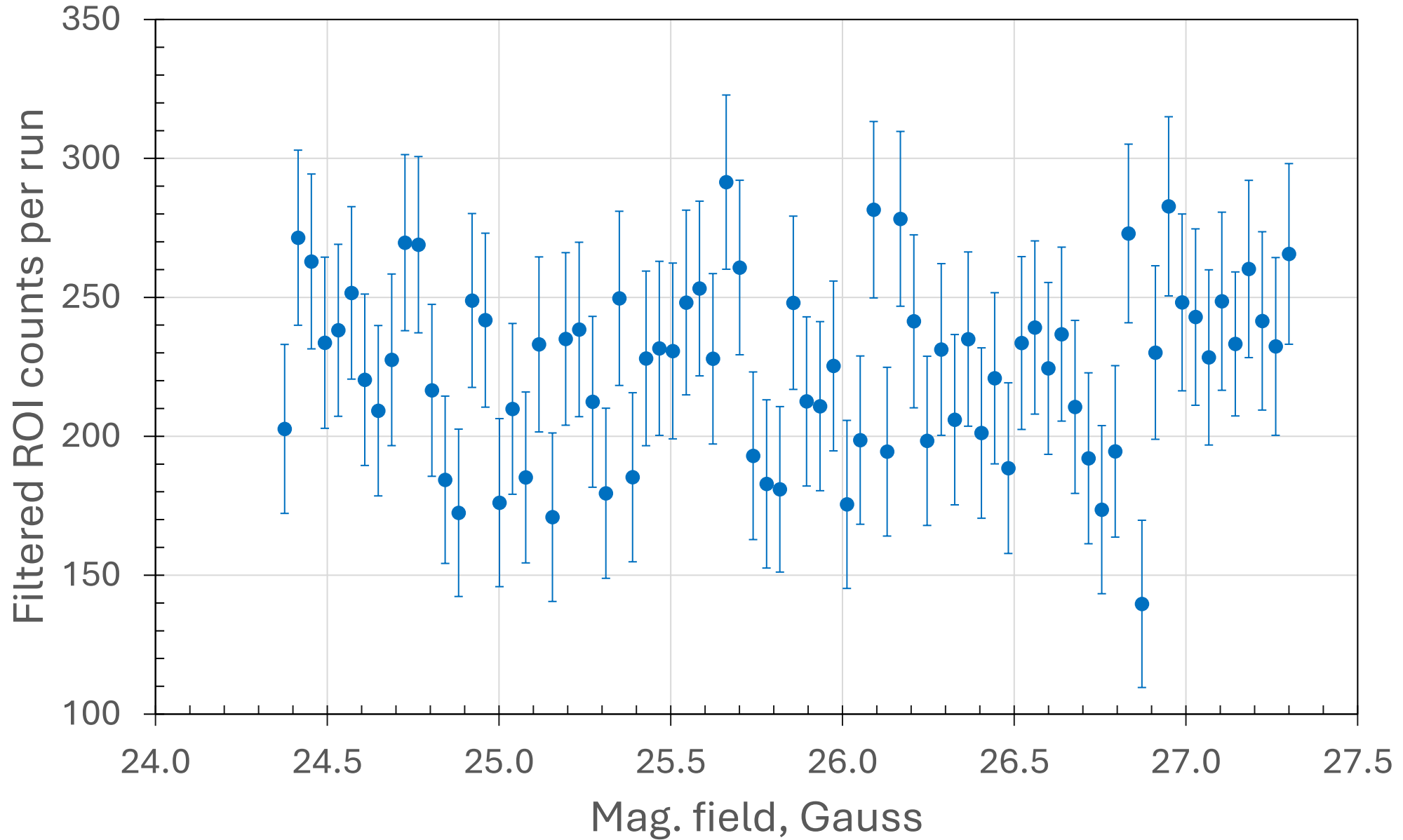
Yuri Kamyshkov for Alina Moore

Data selection for 30-min and 20-min runs of September 2025

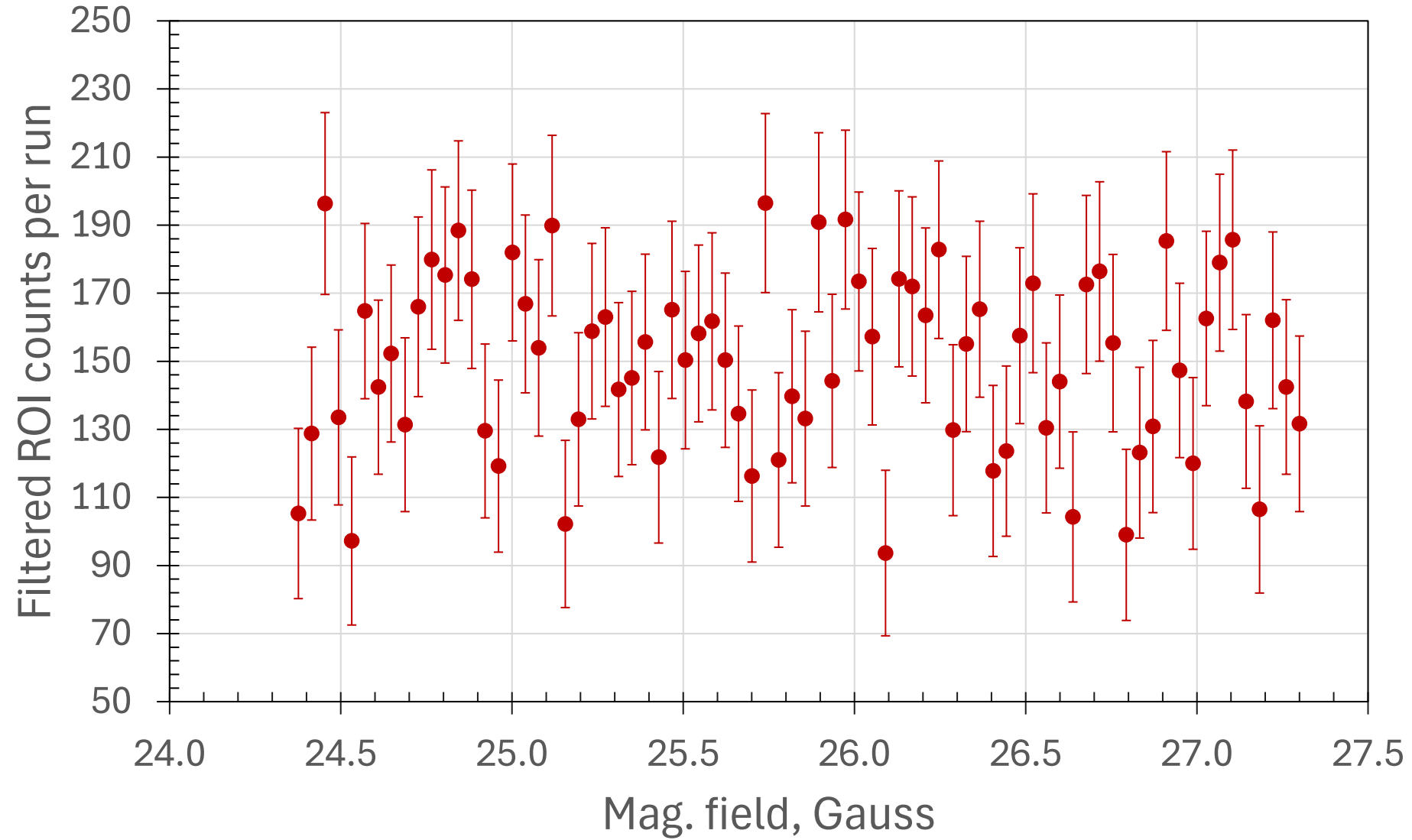
1. GPM relative intensity correction with ref. run **253** for 30-min series
2. GPM relative intensity correction with ref. run **346** for 20-min series
3. ROI 30 x 36 cm² with fast n peak removed area 13.4 x 13 cm²
4. ROI area 905.8 cm² ; ROI efficiency 90.15%
5. ROB 94 x 96 cm² - dead rim 5 cm around ROI 40 x 46 cm²
6. ROB area 7376 cm², with $A_{ROI}/A_{ROB} = 0.1228$
7. Corrected counts in ROI :

$$C_{corr} = C_{ROI} - C_{ROB} \cdot \frac{A_{ROI}}{A_{ROB}}$$

30 min runs

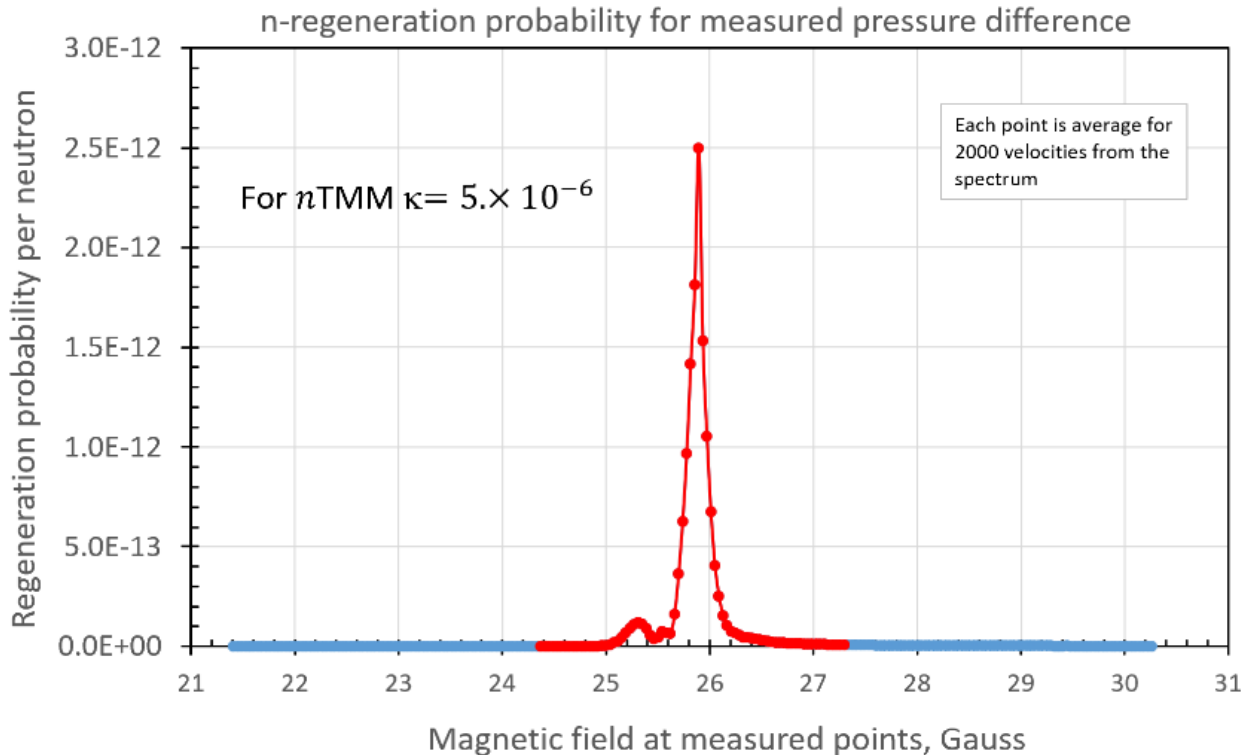


20 min runs

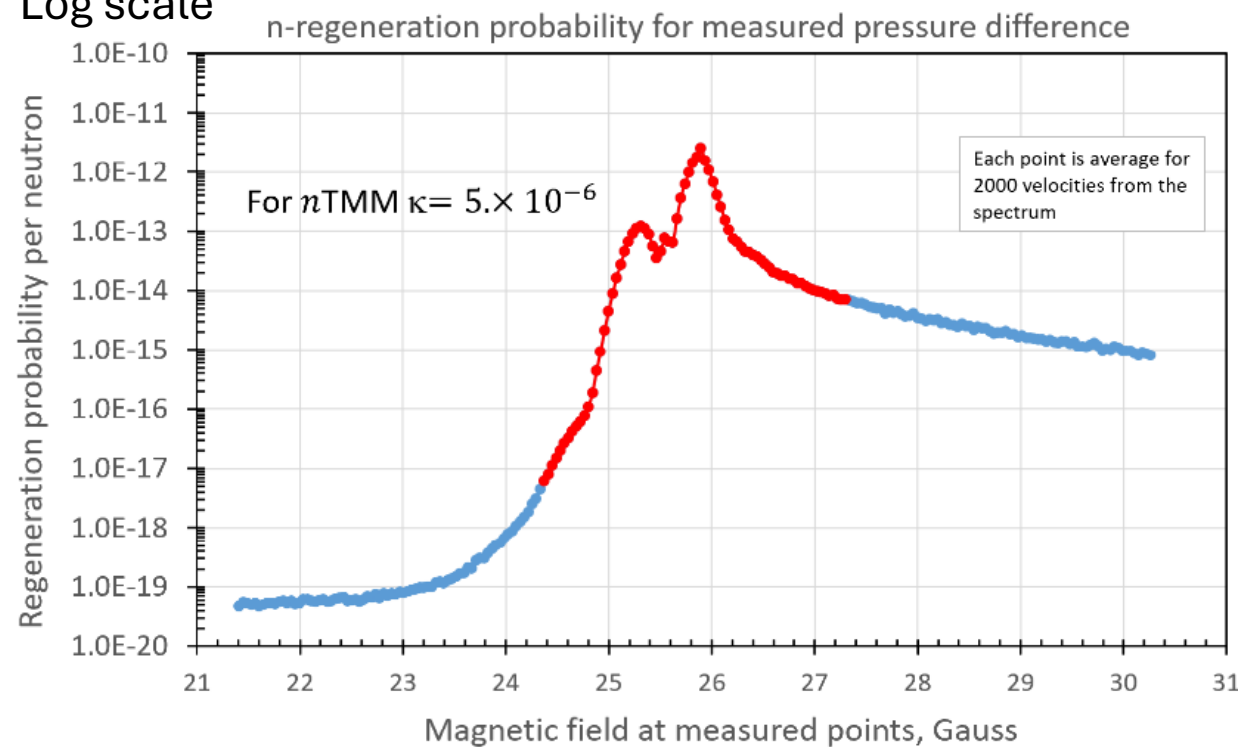


Expected regeneration effect probability at $\kappa = 5 \times 10^{-6}$ without background
 n TMM probability $f(B)$ for different pressures in magnets

Lin scale

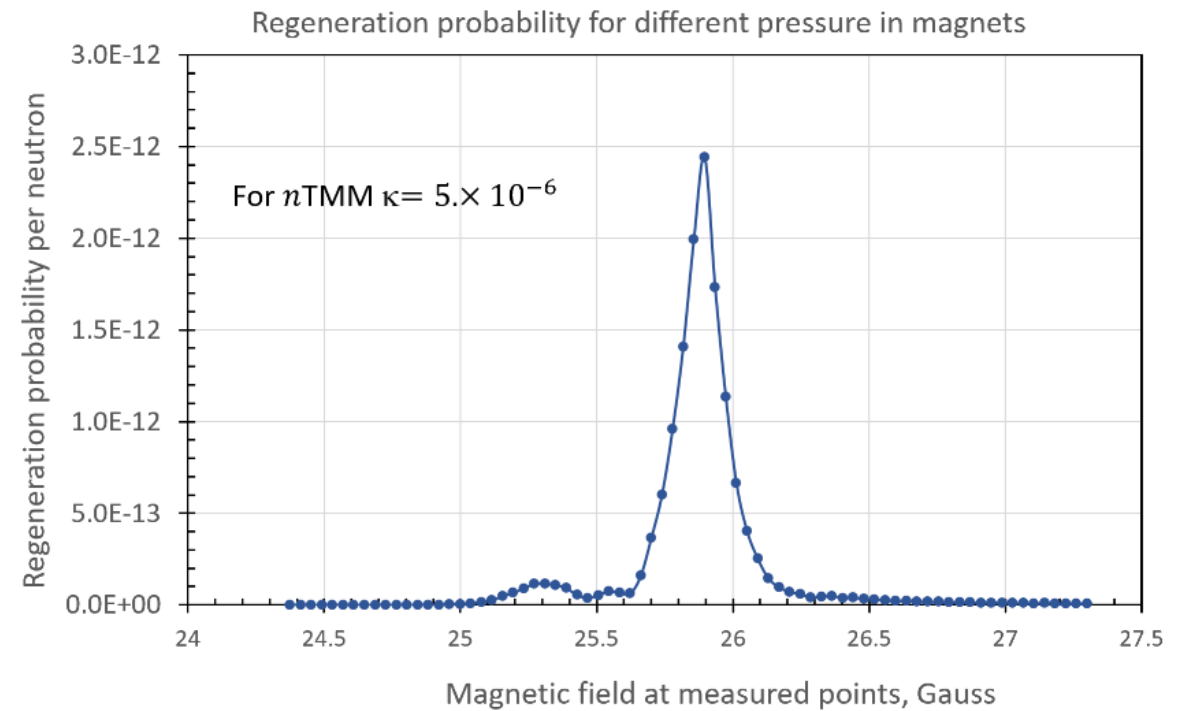
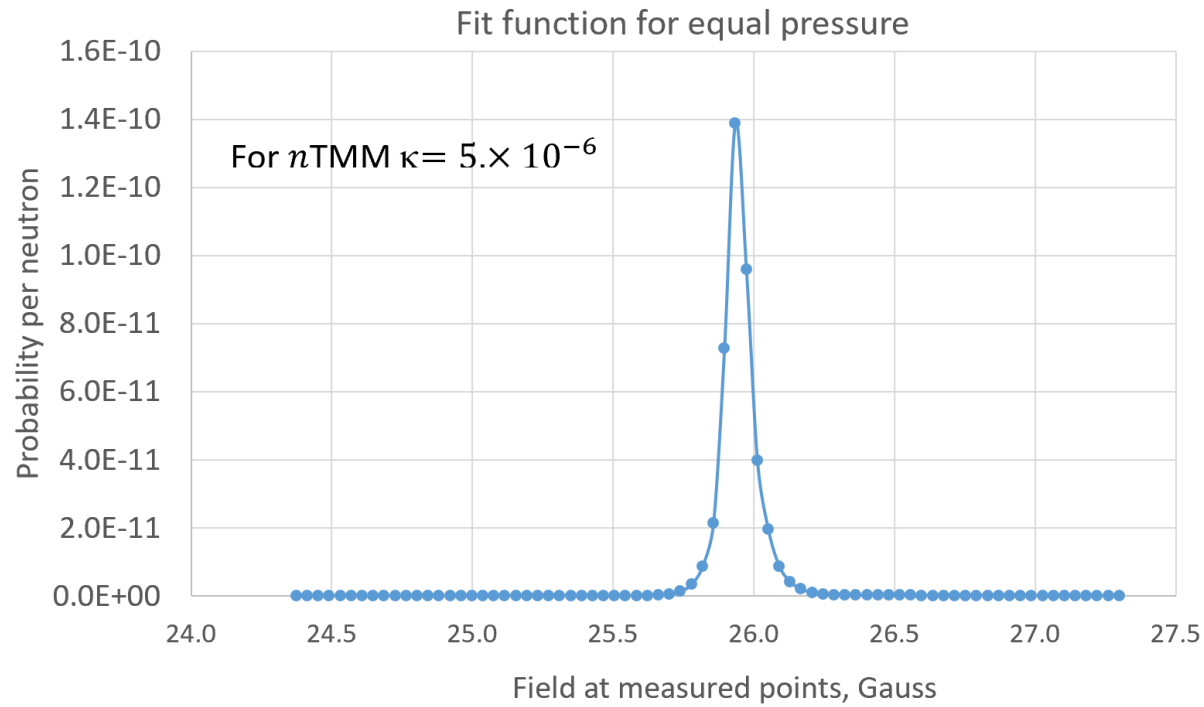


Log scale



Peak value is regeneration probability 2.5×10^{-12} for $\kappa = 5 \times 10^{-6}$

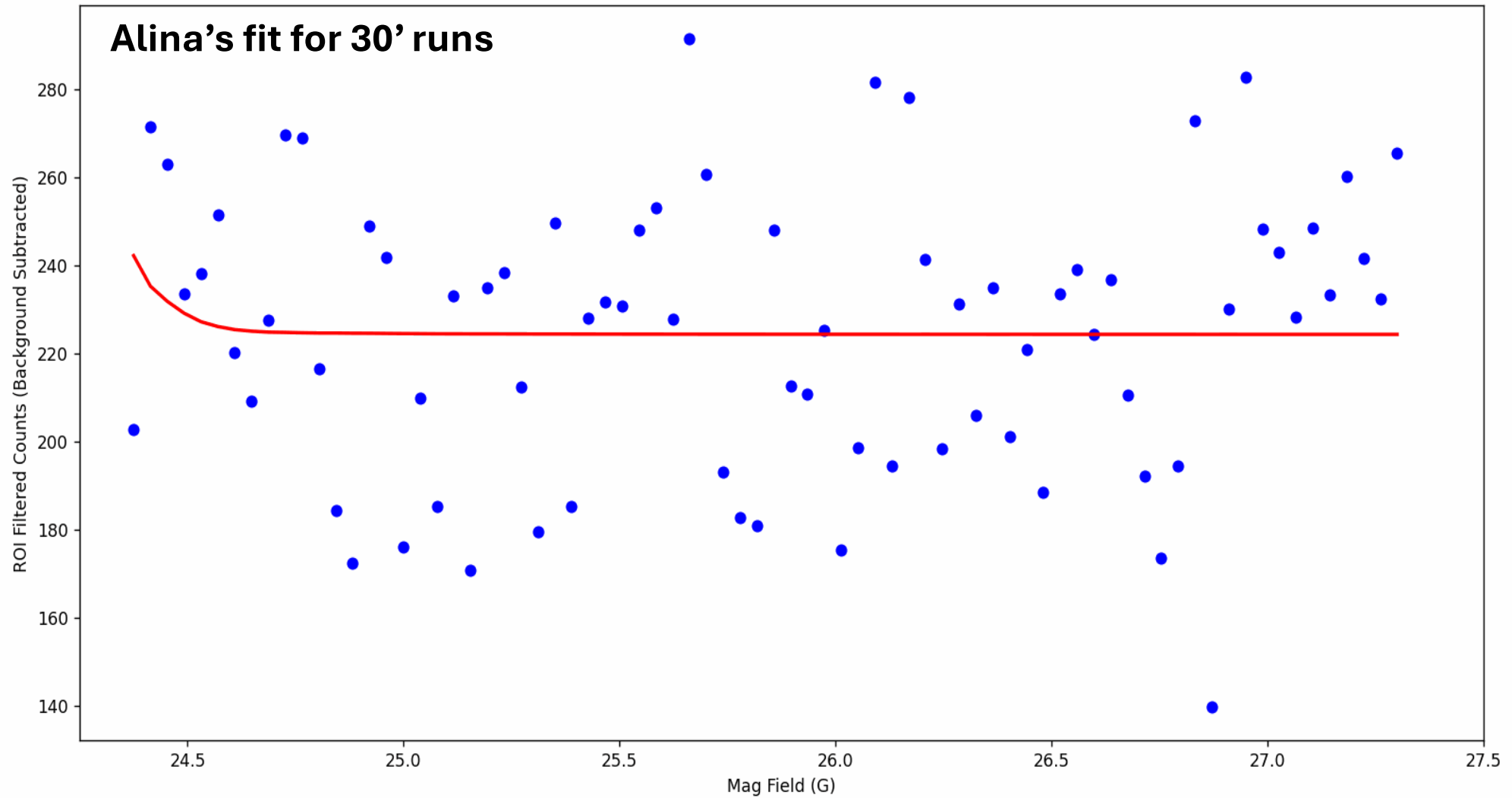
Effect of pressure difference



Peak 1.39×10^{-10}

Peak 2.5×10^{-12}

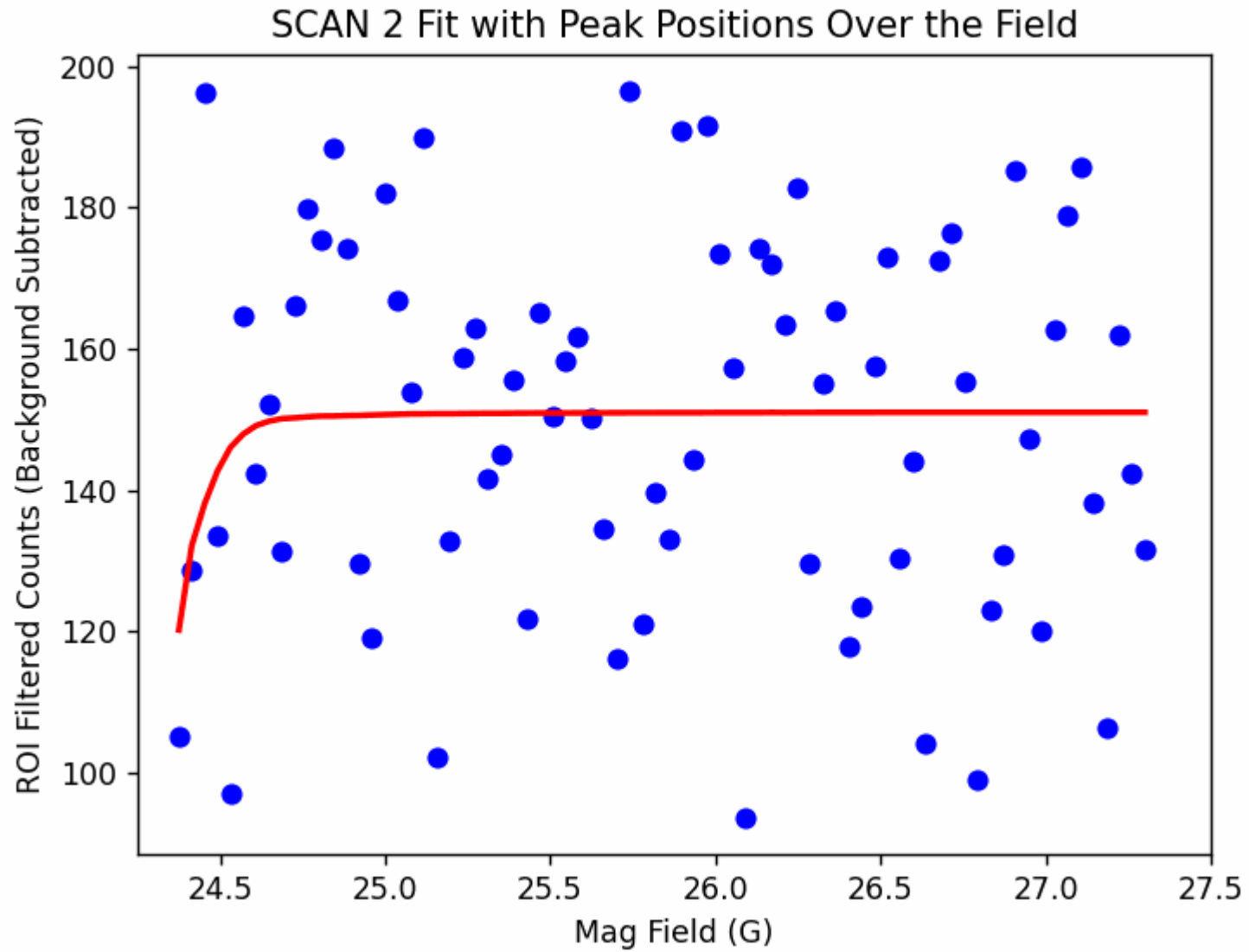
Reduction by 56 times



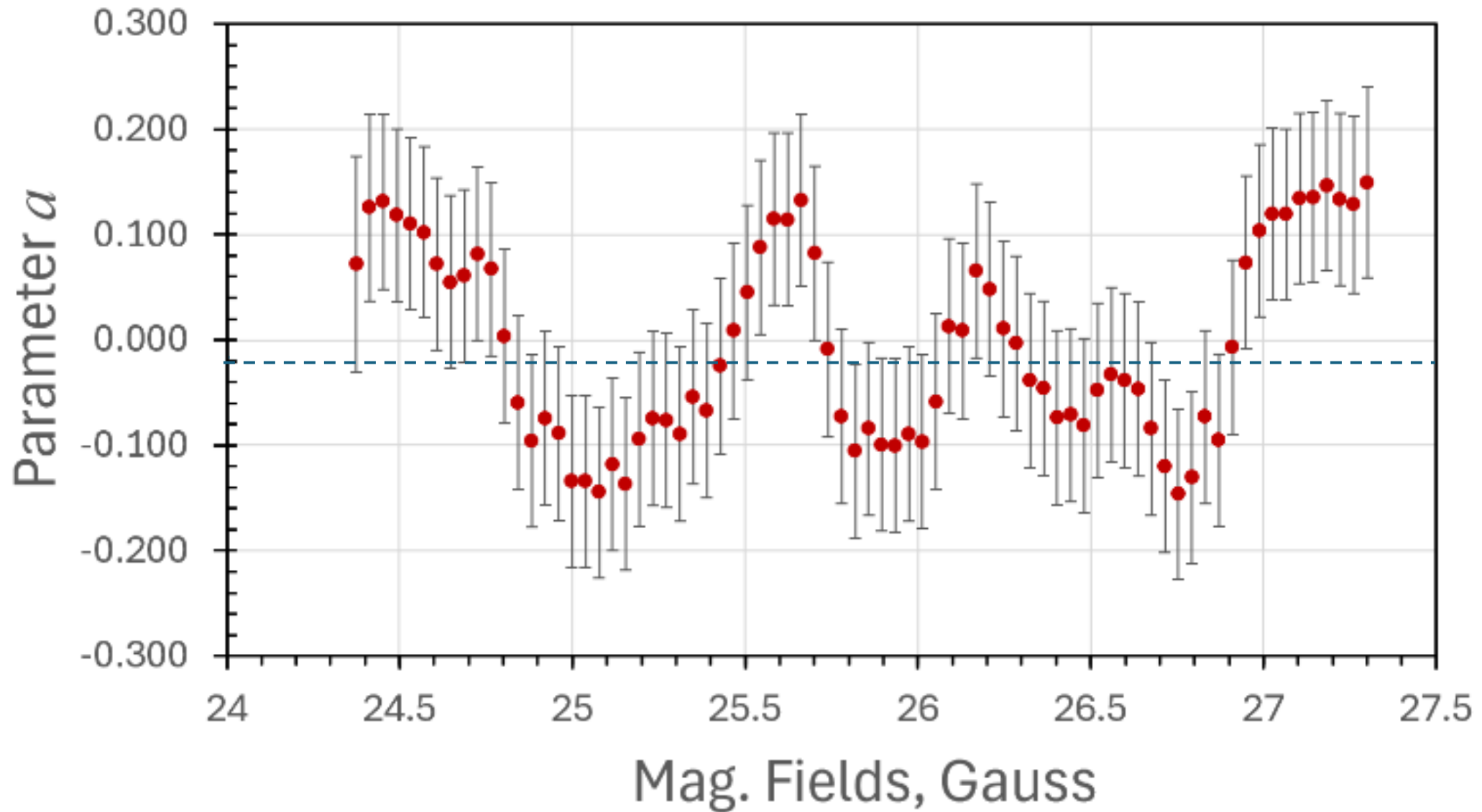
Fit function : $F(B) = a \cdot f(B) \cdot 10^{14} + b$

$\langle a \rangle \pm \langle \delta a \rangle = 0.827 \pm 0.827$; $\langle b \rangle \pm \langle \delta b \rangle = 225.185 \pm 3.909$

Alina's fit for 20' runs

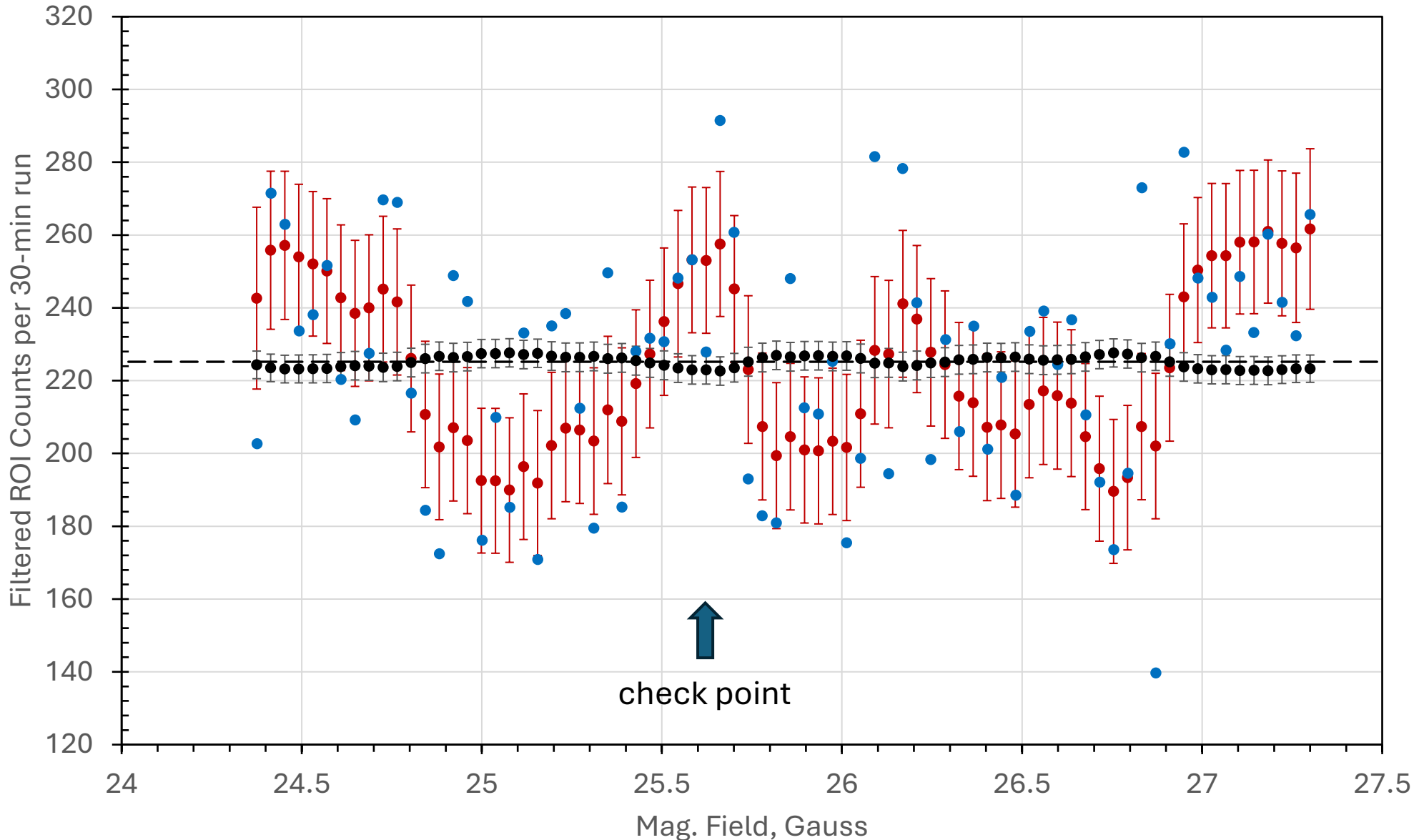


30-min series



$$\langle a \rangle \pm \langle \delta a \rangle = 0.827 \pm 0.827$$

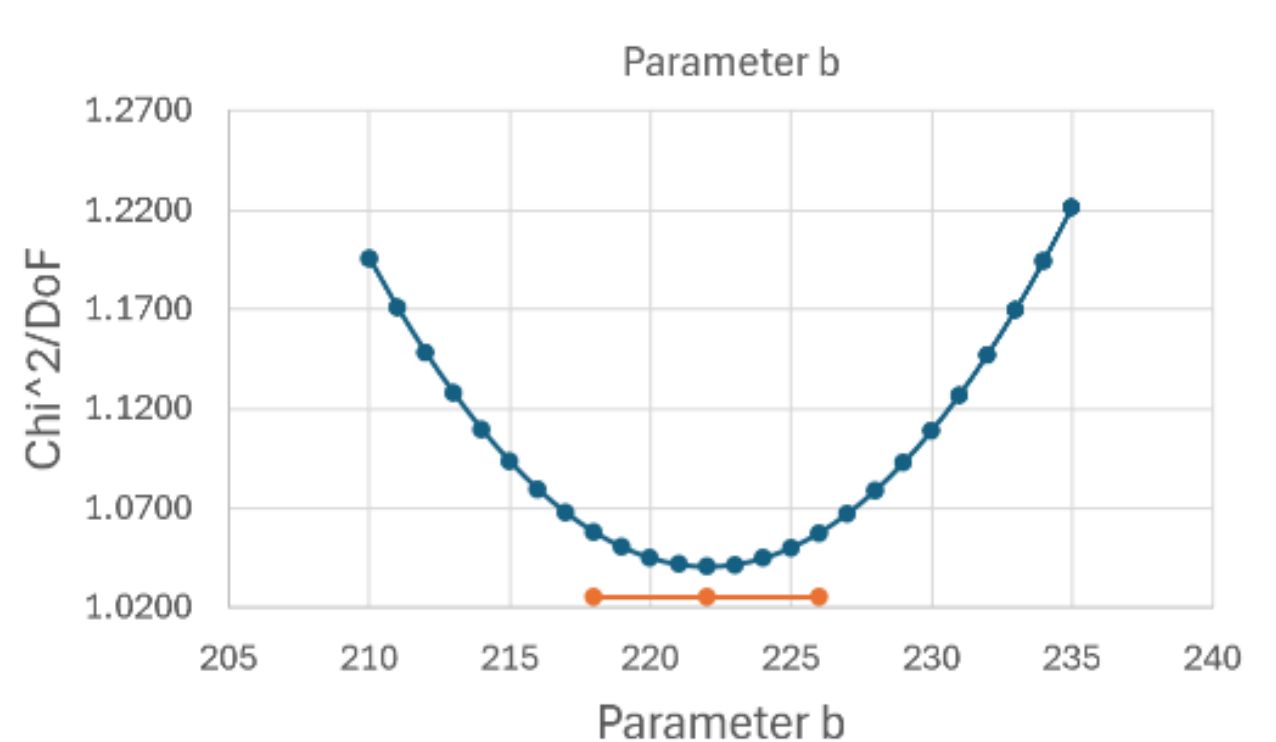
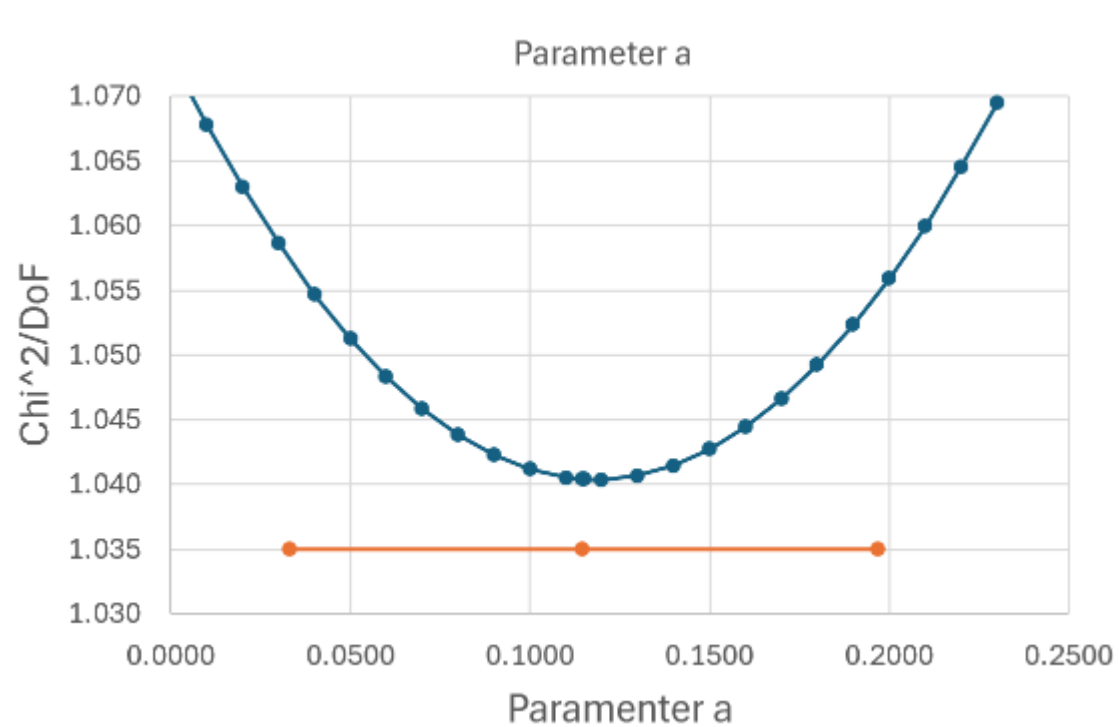
blue – 30-min series points, red – parameter a , black – parameter b



Check point at B=25.584 G:
peak at this position

$$a = 0.115 \pm 0.082; \quad b = 222.956 \pm 3.914$$

$$\frac{\chi^2}{DoF} = 1.0404$$



For one point with probability peak 2.5×10^{-12} sitting at $B=25.584$ G fit shows $a = 0.115 \pm 0.082$, i.e. on the scale of ROI counts per run

$$2.5 \times 10^{-12} \cdot 10^{14} \cdot 0.115 \Rightarrow 28.75 \pm 20.5 \text{ events}$$

or using C-F 95% CL < 48.4 events per run

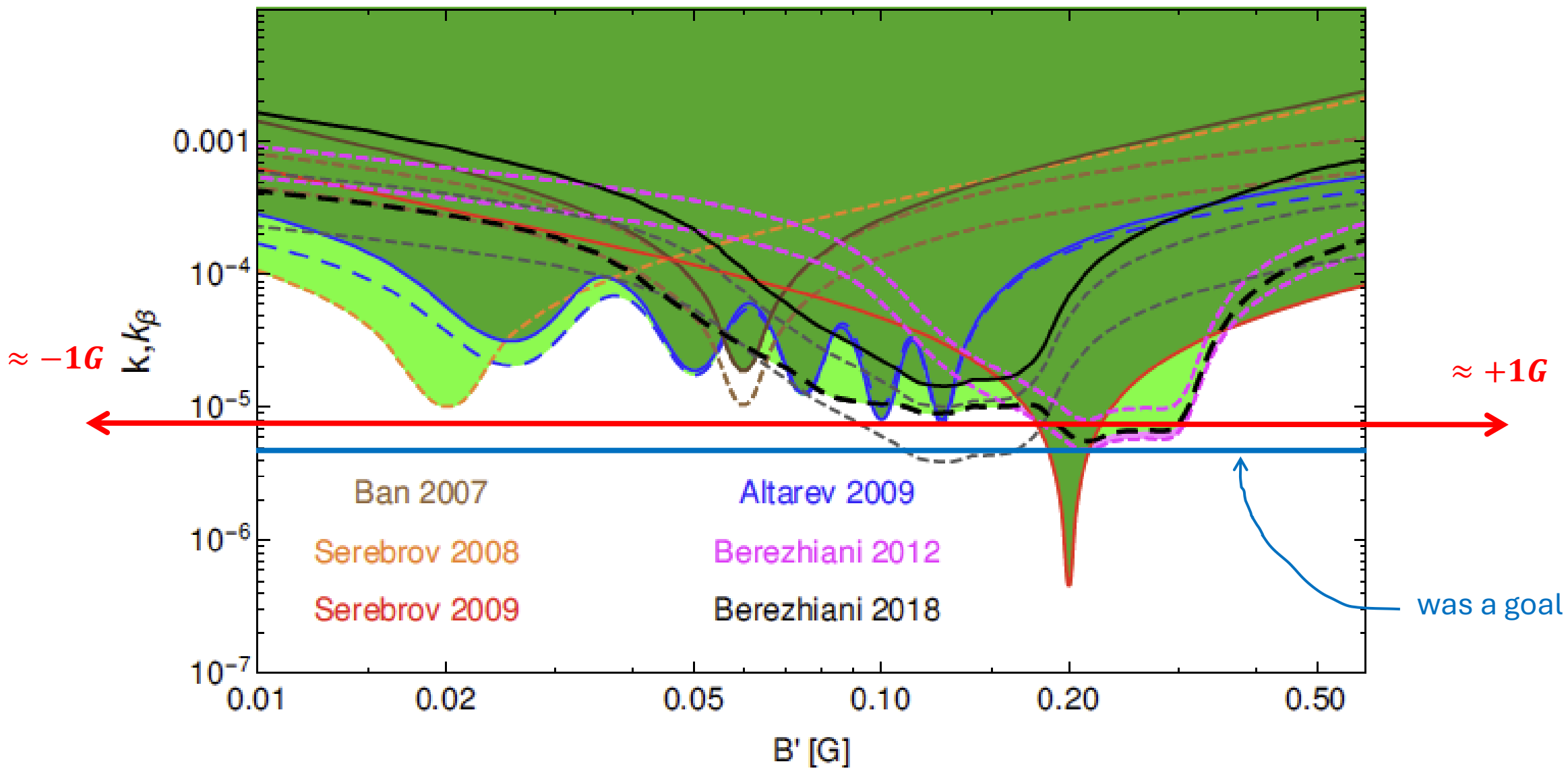
Beam intensity (one polarization only) = 4×10^{12} n/30'

Probability per neutron $< 1.21 \times 10^{-11}$ per neutron with CL 95%

If peak $2.5 \times 10^{-12} \Rightarrow 10$ events per run for $n\text{TMM } \kappa = 5 \cdot 10^{-6}$

< 48.4 events means $\kappa < 7.5 \cdot 10^{-6}$ with 95% CL (one point)

{assuming that magnetic shielding was perfect}



Very preliminary :

if $\kappa(nTMM) = 0$ but, what τ we are currently excluding for $B' \pm 1$ Gauss

