

Data Correction Error Propagation

Curve fit using runs $|B|=0$, counts within region of interest

Finding error for measurement, fit function, and error propagation for difference

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Fit Considerations

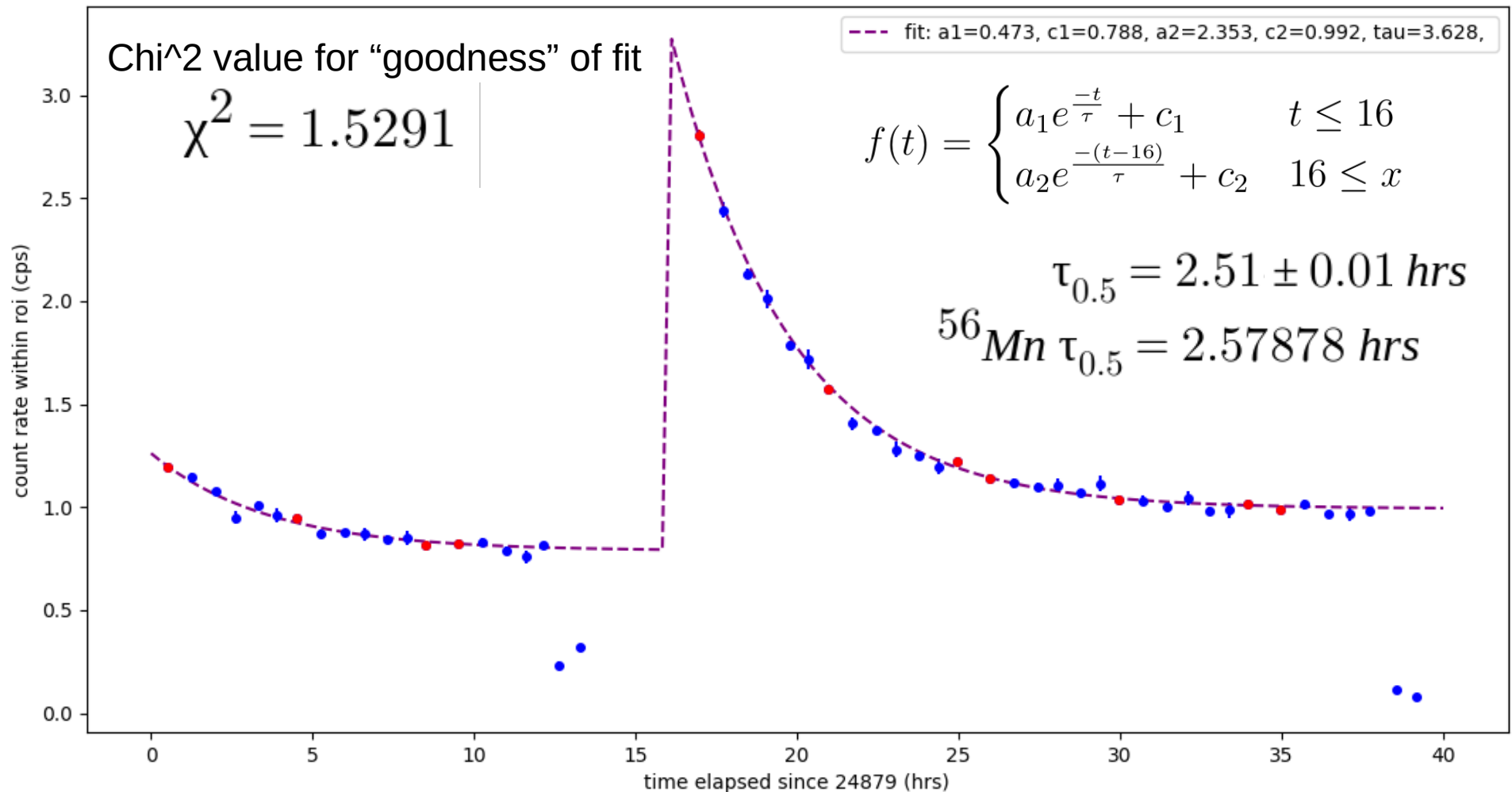
- Time for run set to midpoint of run
- Curve is fit to Runs with $|B| = 0T$
- Piecewise function because two sequences with different background

$$\delta_R = \frac{\sqrt{N}}{\Delta t}$$

- Error for measured rate = $\text{sqrt}(N)$ / total length of run in seconds
- N = total counts within roi for run
- Error for time negligible, not considered in error propagation

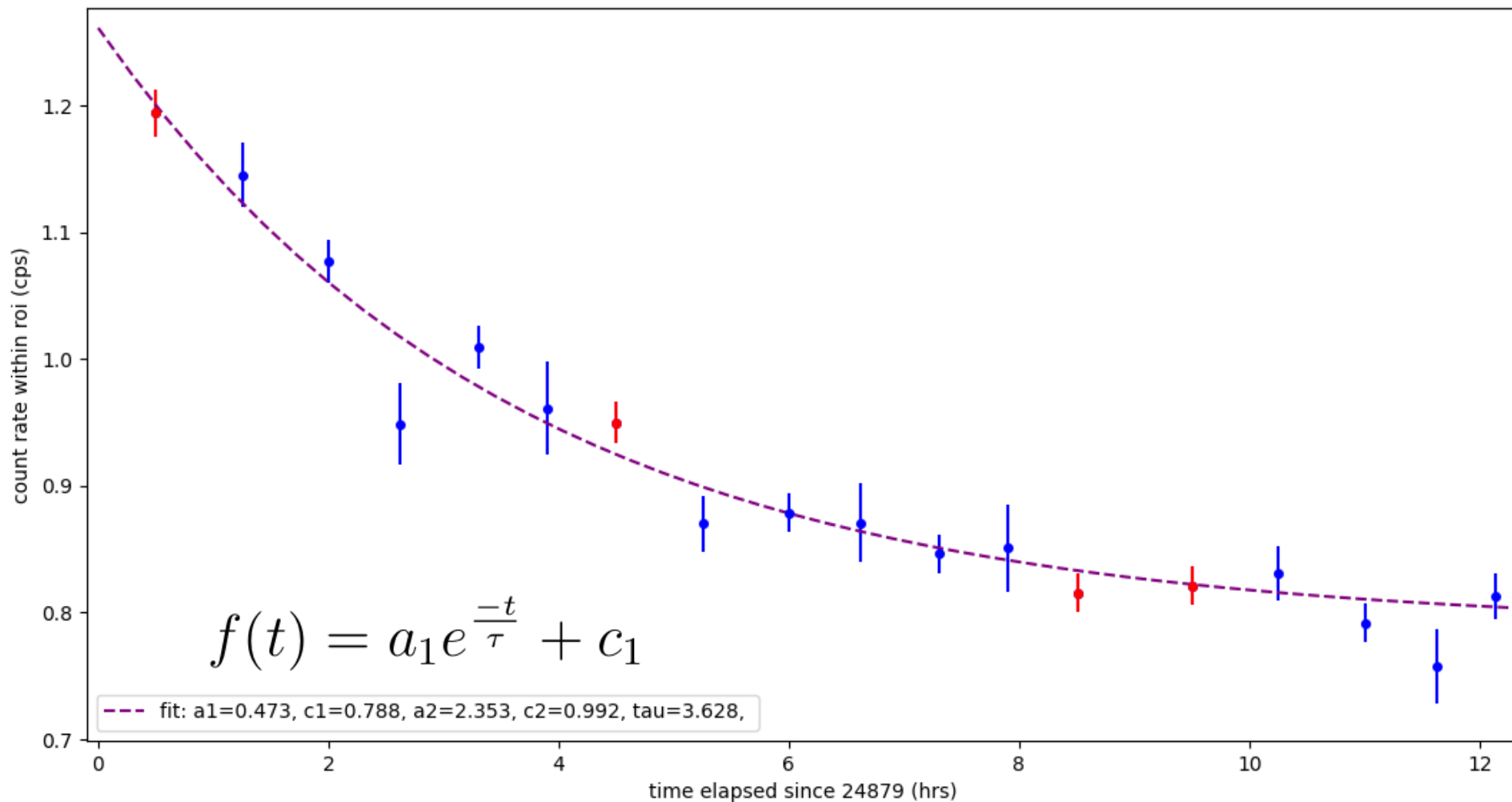
All runs with errorbars

Red runs have field $|B|=0$,
curve is fit to red points



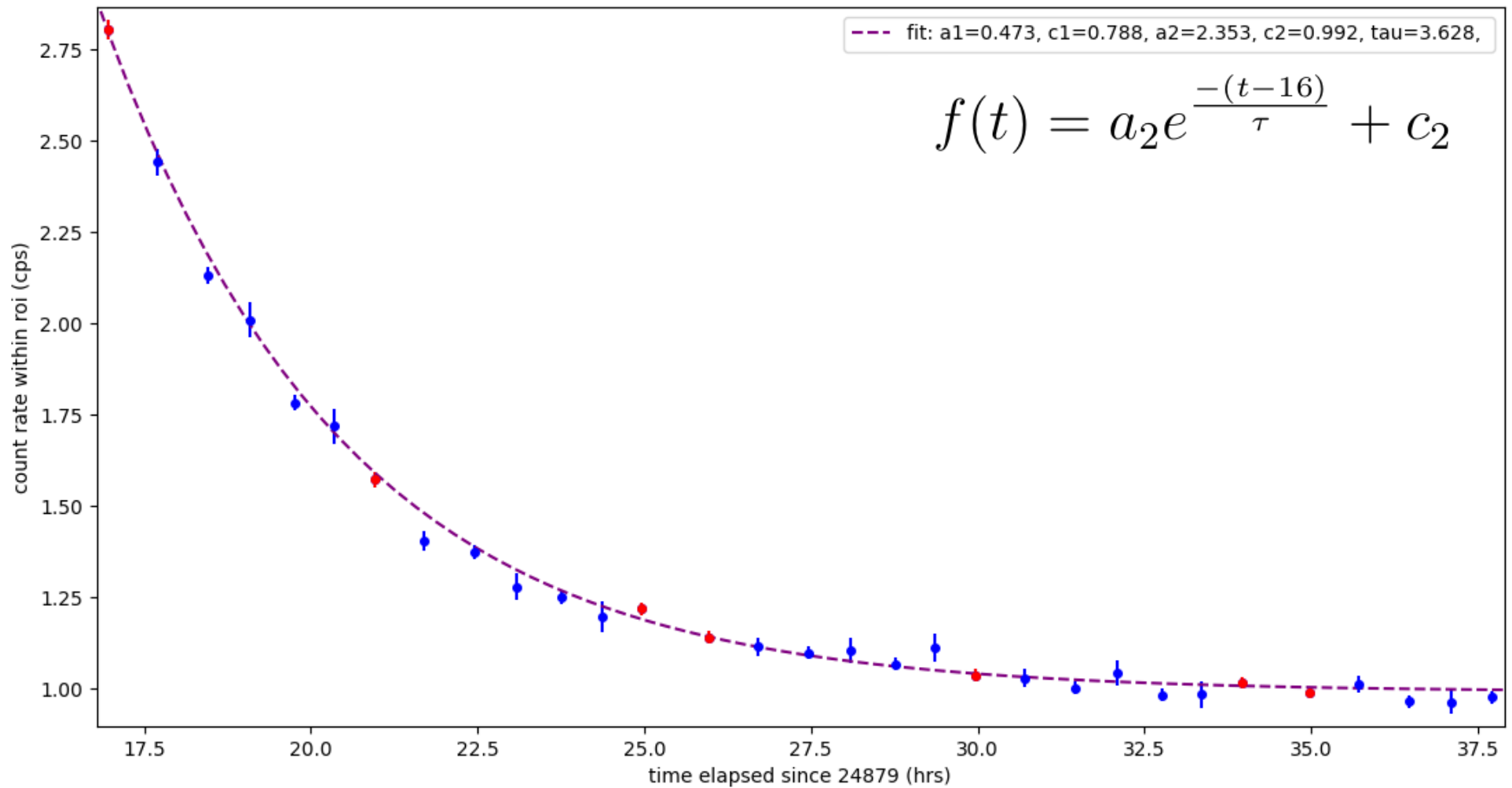
Exp1 runs with errorbars

Red runs have field $|B|=0$



Exp2 runs with errorbars

Red runs have field $|B|=0$



Error propagation for correction

→ $measured - predicted = residual$

$$R_m - R_p = R_r$$

→ $\delta_R = \frac{\sqrt{N}}{\Delta t}$

Error for measured values defined as $\sqrt{\text{total counts}} / \text{total length of run}$

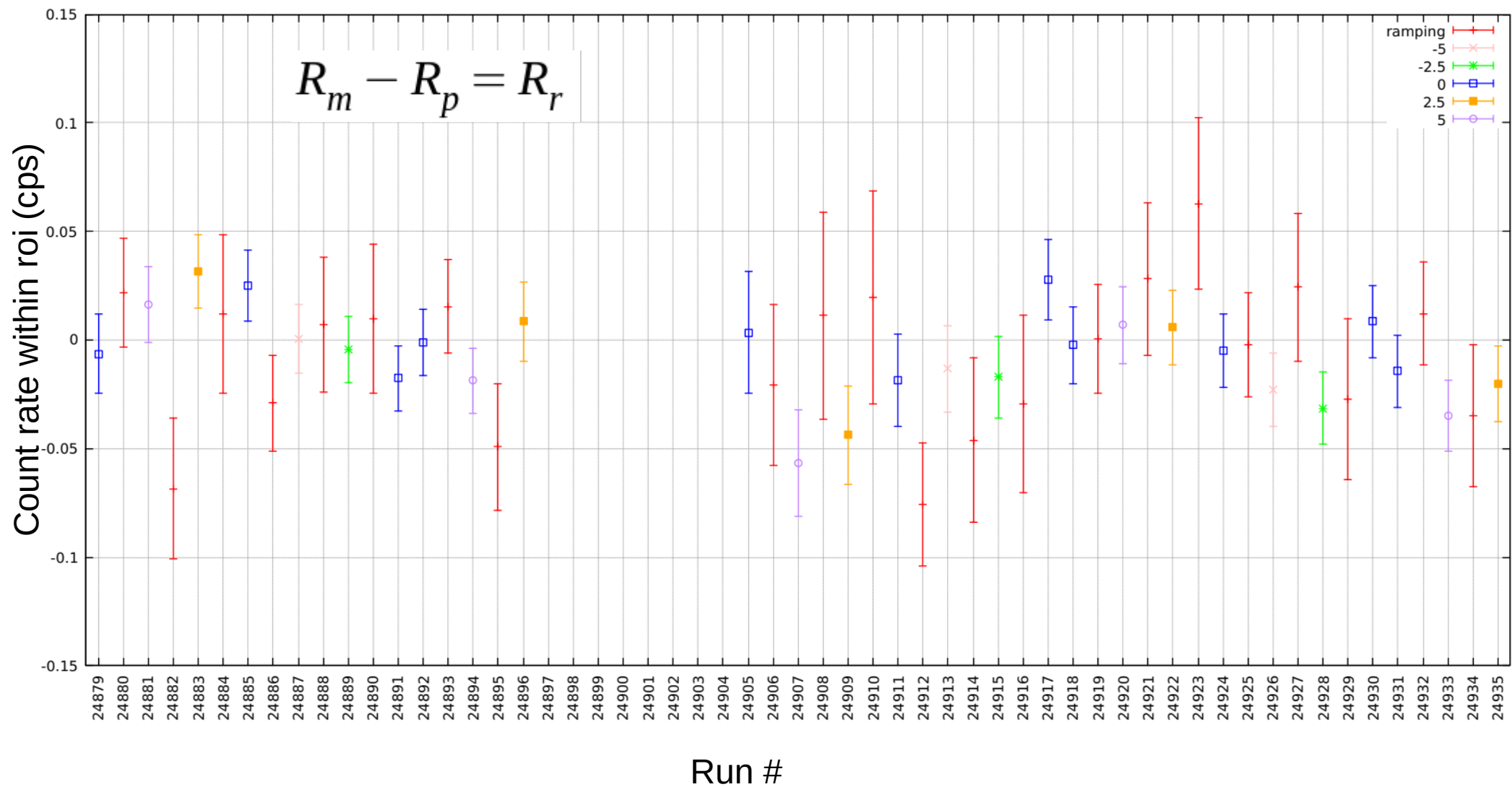
→ $\delta_p(t) = \frac{1}{2} \left(f(t, \text{params} + \text{error}) - f(t, \text{params} - \text{error}) \right)$

Error for fit defined as half of difference between
(fit function with params + param error) and (fit function with params - param error)

→ $\delta_r = \sqrt{\delta_m^2 + \delta_p^2}$

Error propagation for corrected counts = add in quadrature

Corrected count rate within roi



Corrected count rate within roi

