

# Intensity Correction Methods Comparison

## Includes:

- McStas simulated intensity transmission factors
- LEM/ GPM measured intensity comparison
  - BEX intensity correction comparison

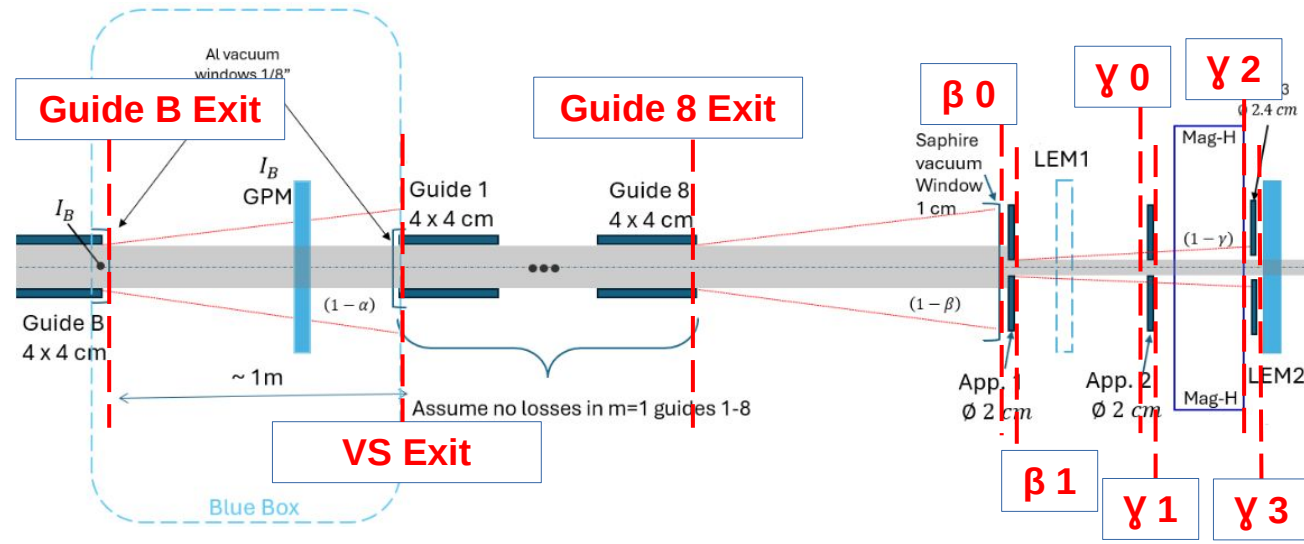
## TODO:

- Final intensity estimate at sample position for  $|B|=0$  runs

# McStas Simulated Transmission Efficiencies

- no misalignment or guide reflectivity degradation

Position	Intensity
Guide B Exit	$2.29e10 \pm 2.9e8$
VS Exit	$2.10e10 \pm 1.1e9$
Guide 8 Exit	$1.99e10 \pm 1.0e9$
$\beta 0$	$1.72e10 \pm 2.2e8$
$\beta 1$	$3.92e9 \pm 1.1e8$
$\gamma 0$	$3.92e9 \pm 1.1e8$
$\gamma 1$	$3.78e9 \pm 1.1e8$
$\gamma 2$	$3.77e9 \pm 1.0e8$
$\gamma 3$	$3.77e9 \pm 1.0e8$

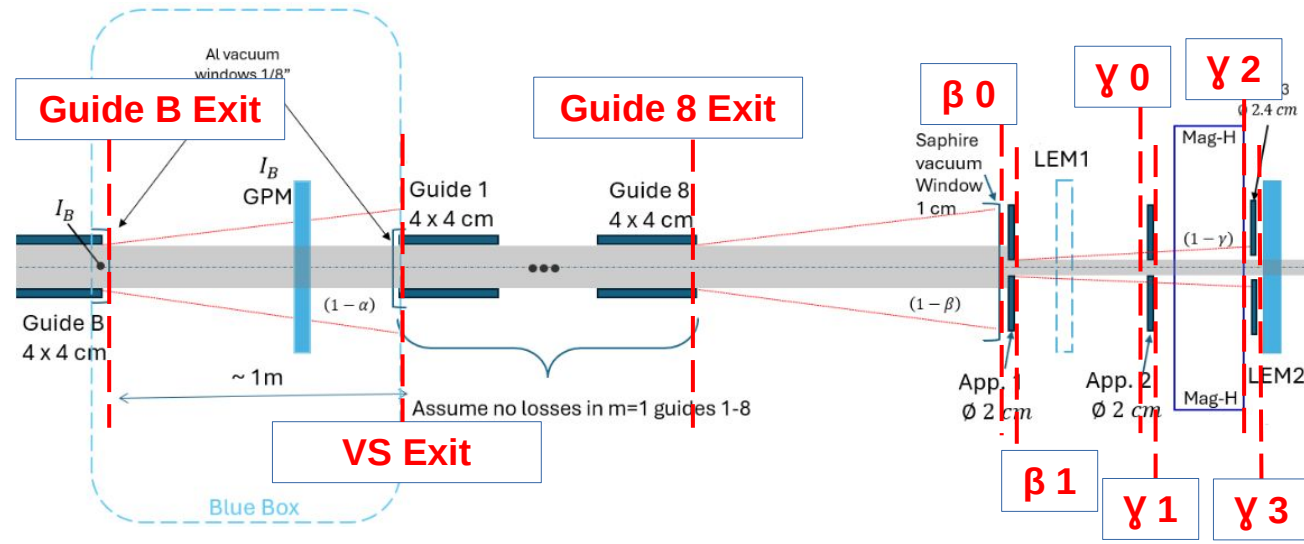


- VS Exit/ Guide B Exit = **91.7% ± 4.9%**  
 →  $\alpha = 8.3\%$
- $\beta 1$ / Guide 8 Exit = **19.7% ± 1.1%**  
 →  $\beta = 80.3\%$
- $\gamma 3$ /  $\beta 1$  = **96.2% ± 3.7%**  
 →  $\gamma = 3.8\%$
- $\gamma 3$ / Guide B Exit = **16.5% ± 0.5%**

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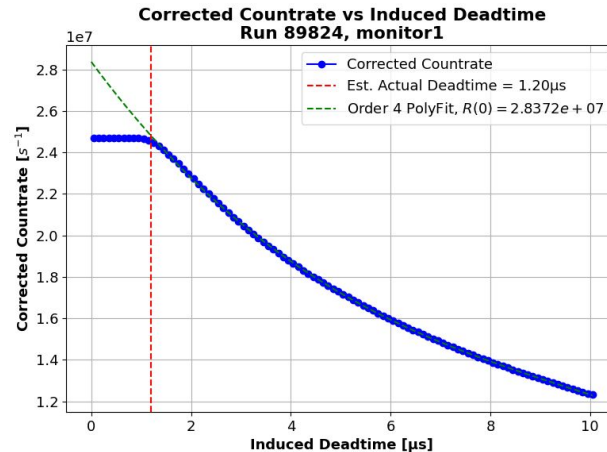
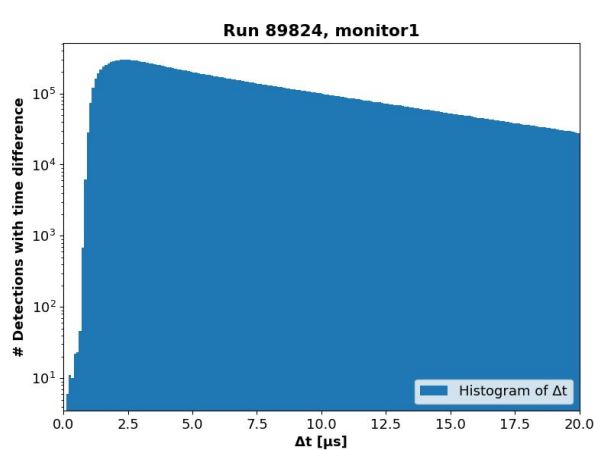


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---> This will be LEM/GPM ratio

# Deadtime Corrected Measurements

Run	GPM Counts	BEX Correction	LEM Counts	BEX Correction
<b>89824</b> 219s	2.47e7 1.13e5 cps	2.90e7 (+17%) 1.32e5 cps	4.23e6 1.932e4 cps	4.19e6 (-0.95%) 1.91e4 cps
<b>89949</b> 86s	9.53e6 1.11e5 cps	1.12e7 (+17%) 1.30e5 cps	1.71e6 1.989e4 cps	1.69e6 (-1.2%) 1.97e4 cps
<b>89950</b> 318s	3.49e7 1.10e5 cps	4.09e7 (+17%) 1.29e5 cps	6.32e6 1.987e4 cps	6.24e6 (-1.3%) 1.96e4 cps

## BEX Correction

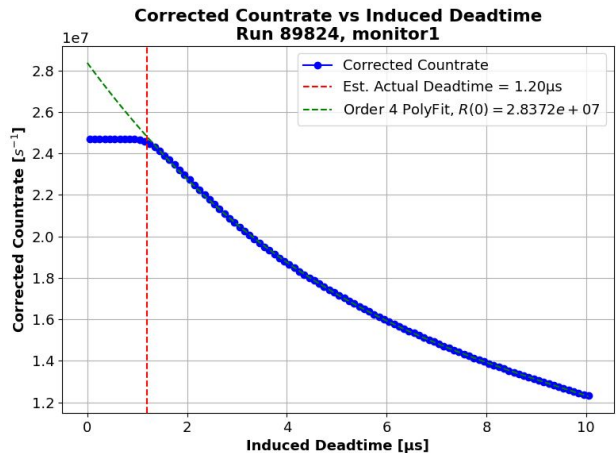
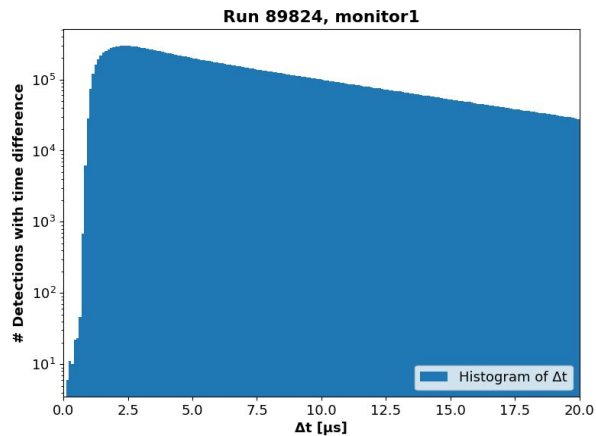


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Original Ratio (LEM/ GPM)	BEX Ratio (LEM/ GPM)
17.1%	14.4%
17.9%	15.1%
18.1%	15.3%

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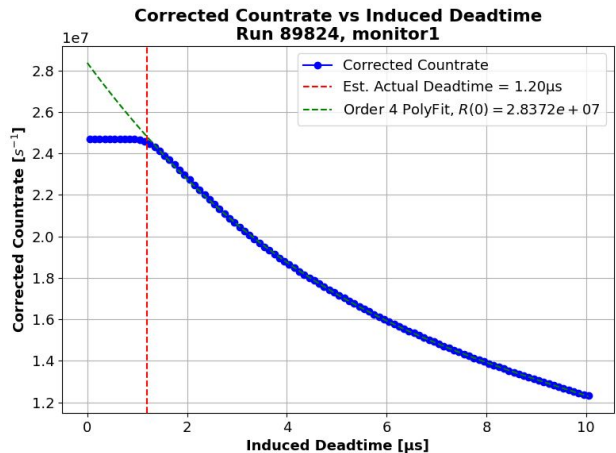
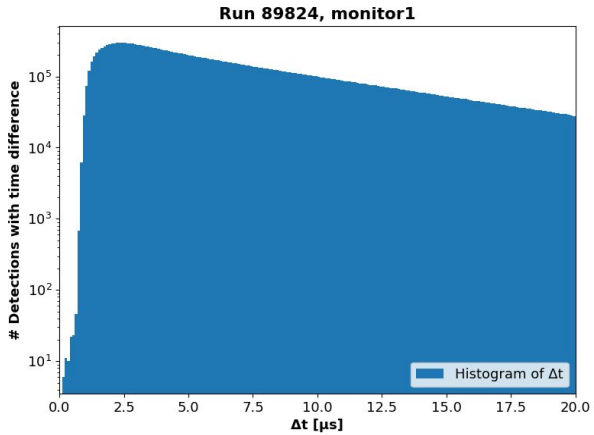


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## BEX Correction



- **McStas transmission simulation predicts 16.5% ± 0.5% transmission efficiency**

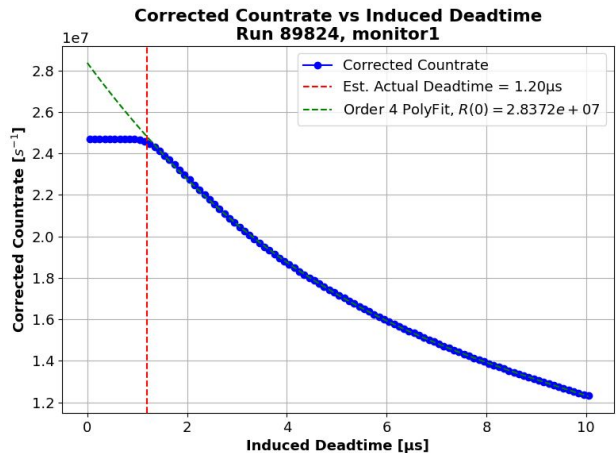
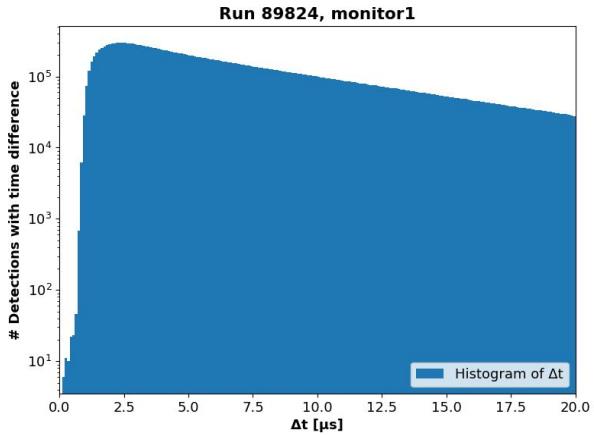
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## BEX Correction



- McStas transmission simulation predicts 16.5% ± 0.5% transmission efficiency
- **Increasing ratio over time is also seen in GP-SANS/ GPM transmission ratio across the entire experiment**

# Conclusion

**Based on LEM US/DS:** Transmission factor is ~15%, increasing over experiment runtime

**Based on Simulation:** Transmission factor is 16.5%

**GPM Intensity for run 89970 (Last |B|=0 1hr run):**

1.08 \* 10<sup>5</sup> cps (measured, without BEX correction)

→ 1.26 \* 10<sup>5</sup> cps (measured, with BEX correction +17%)

→ 4.18 \* 10<sup>9</sup> n/s (based on spectrum efficiency correction 3.307e4)

**Sample position est. Intensity for run 89970:**

With measured transmission factor 15%: 6.27 \* 10<sup>8</sup> n/s

With simulated transmission factor 16.5%: 6.89 \* 10<sup>8</sup> n/s

**Therefore, final estimated intensity at sample position for run 89970 is:**

6.58 \* 10<sup>8</sup> n/s ± 0.31 \* 10<sup>8</sup> n/s

# IPTS 27957 Variable Transmission Efficiency

## Includes:

- Variable transmission efficiency comparison for **|B| = 0 runs**
  - GP-SANS detector counts per ROI for |B|=0 runs
  - GPM counts for |B|=0 runs
  - Ratio of GP-SANS ROIs to GPM for |B|=0 runs

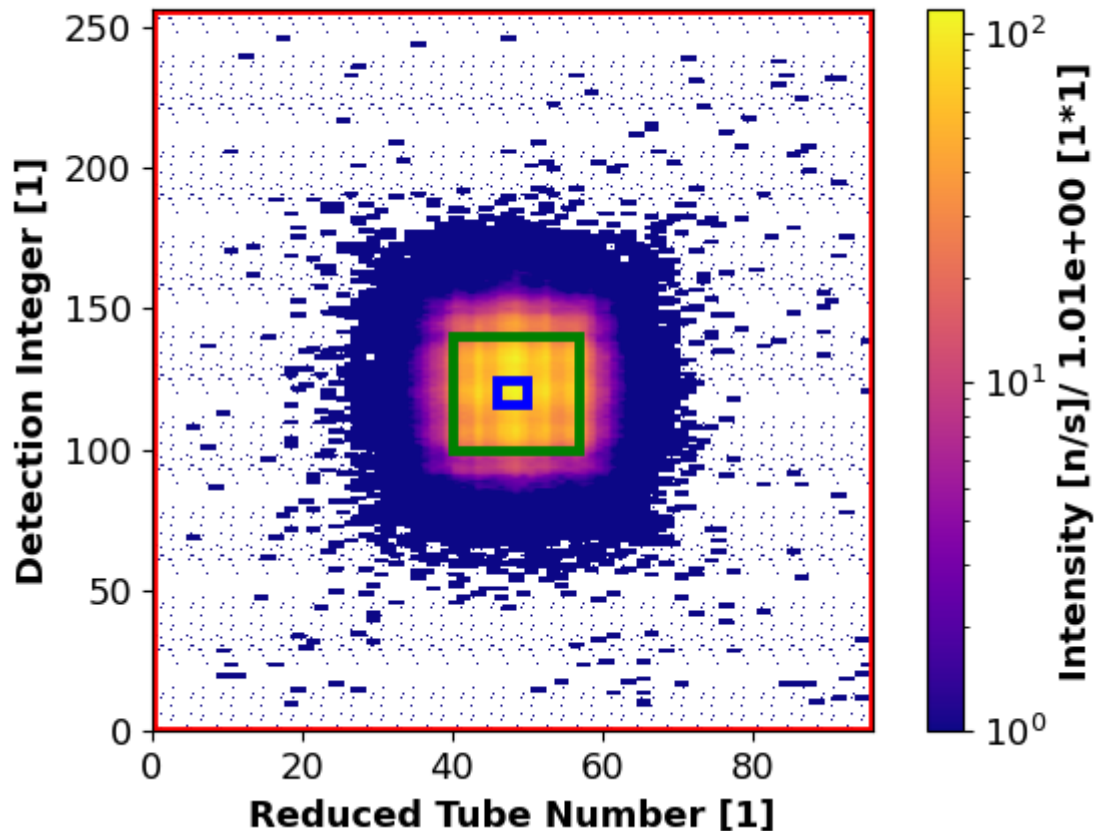
## TODO:

-

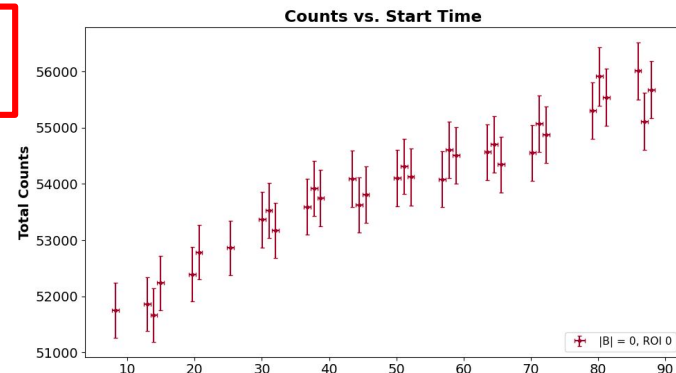
# GP-SANS ROI Counts

$|B|=0$

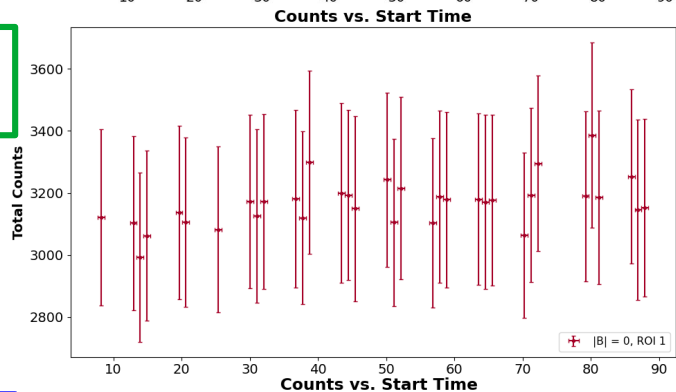
Run 89947



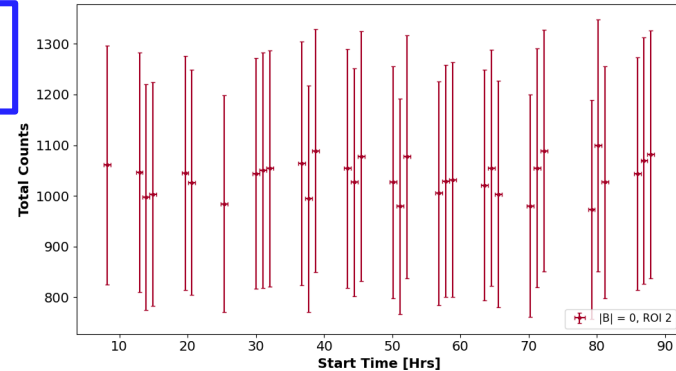
**ROI 0:**



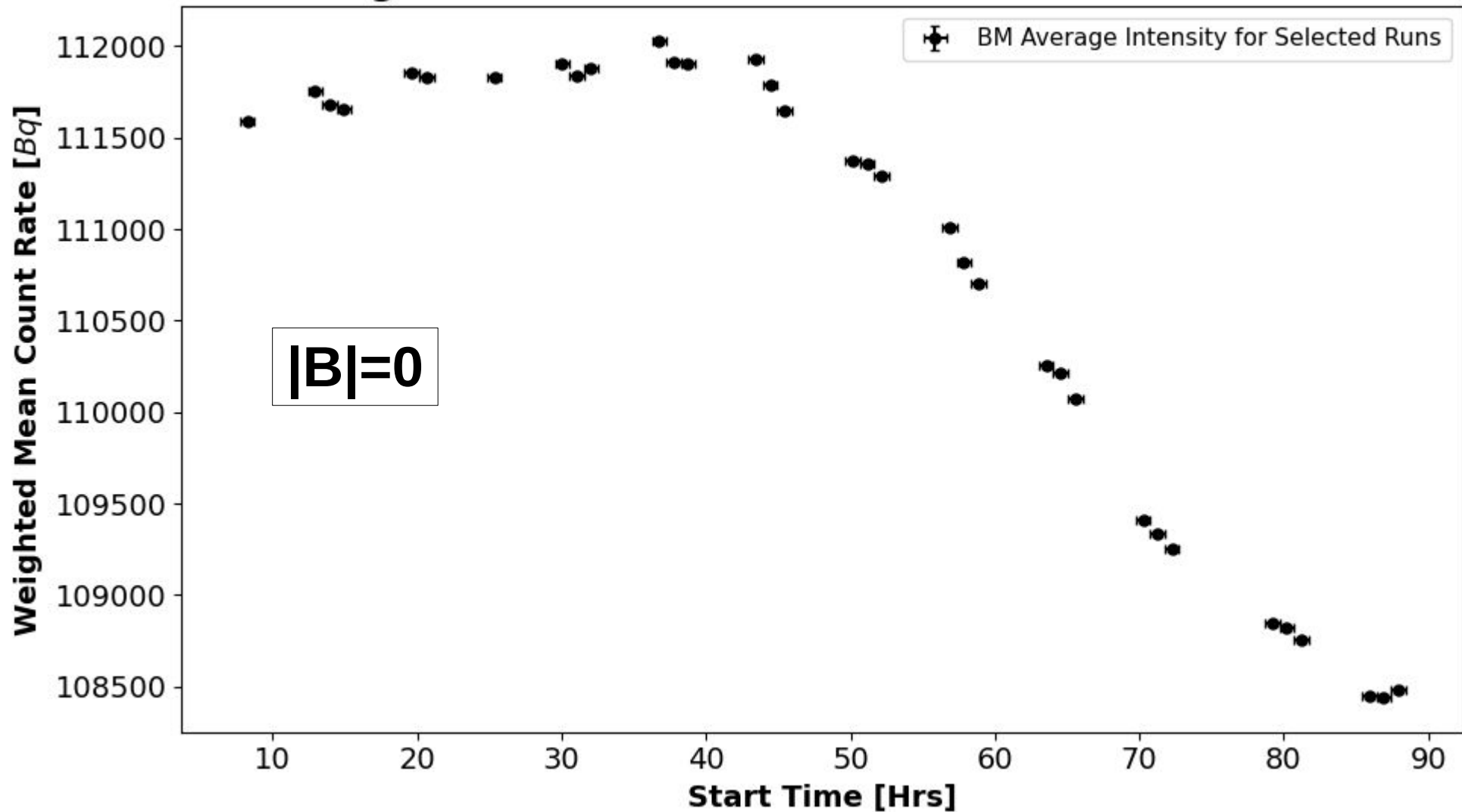
**ROI 1:**



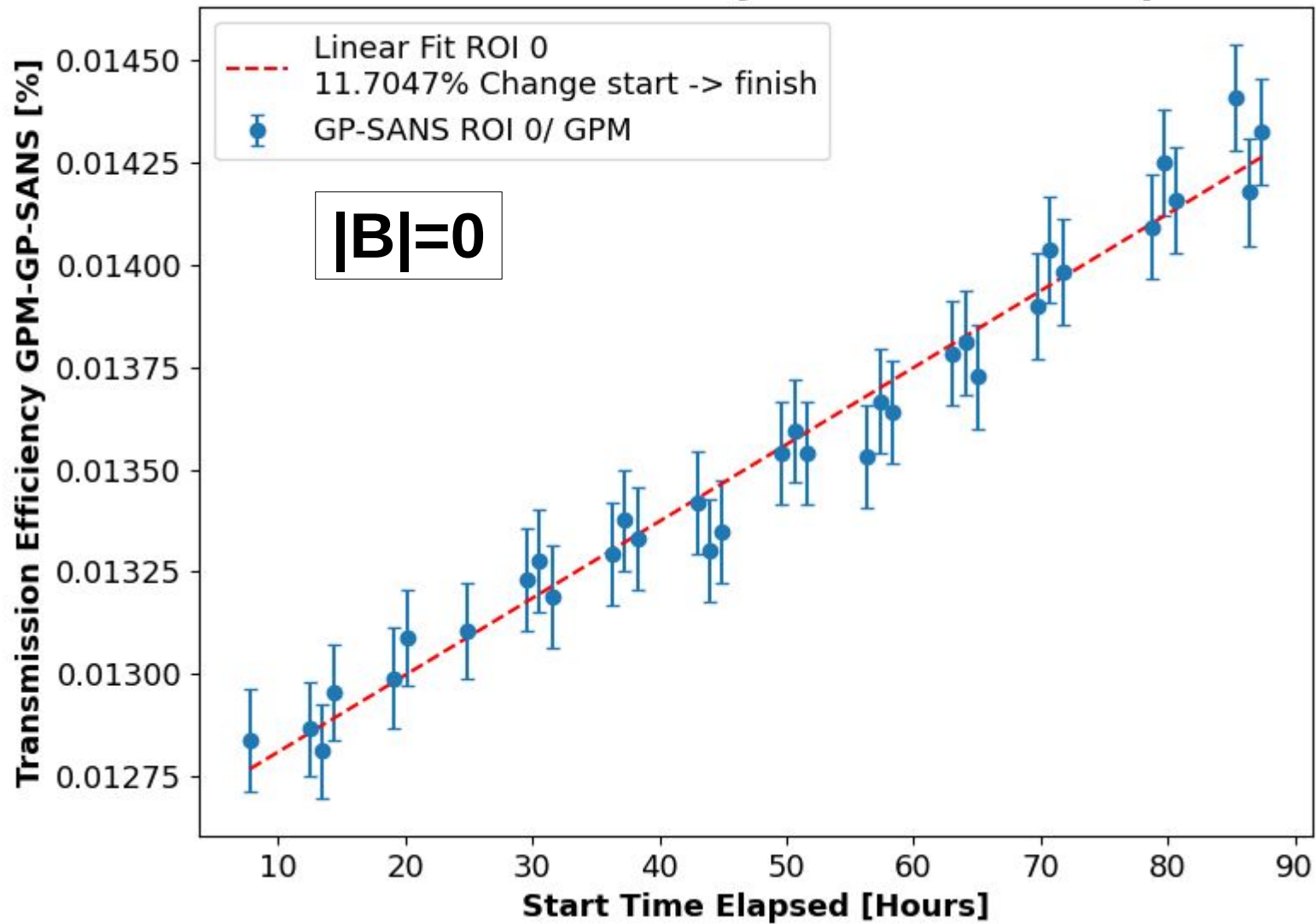
**ROI 2:**



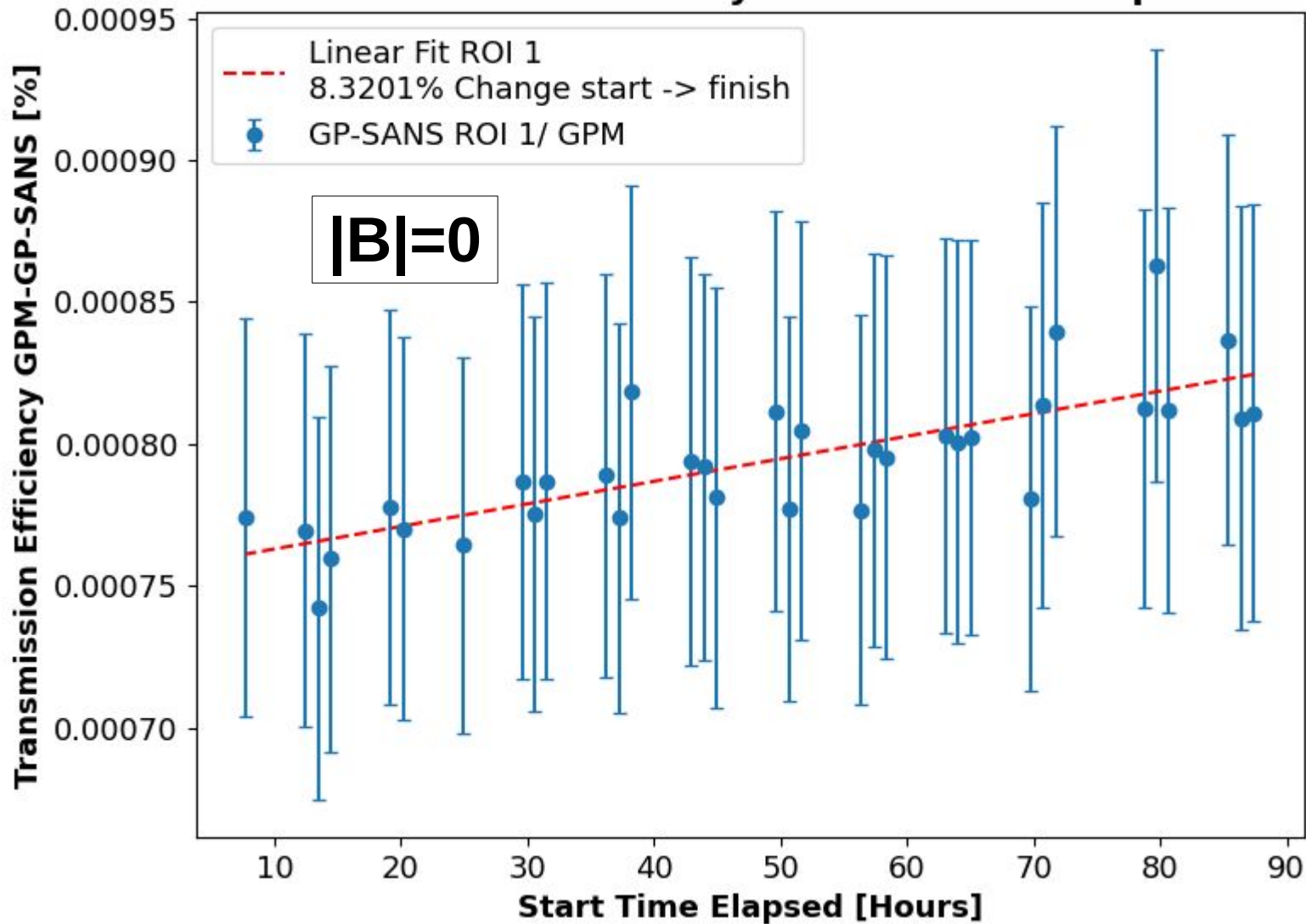
# Average BM Count Rate vs. Start Time for Selected Runs



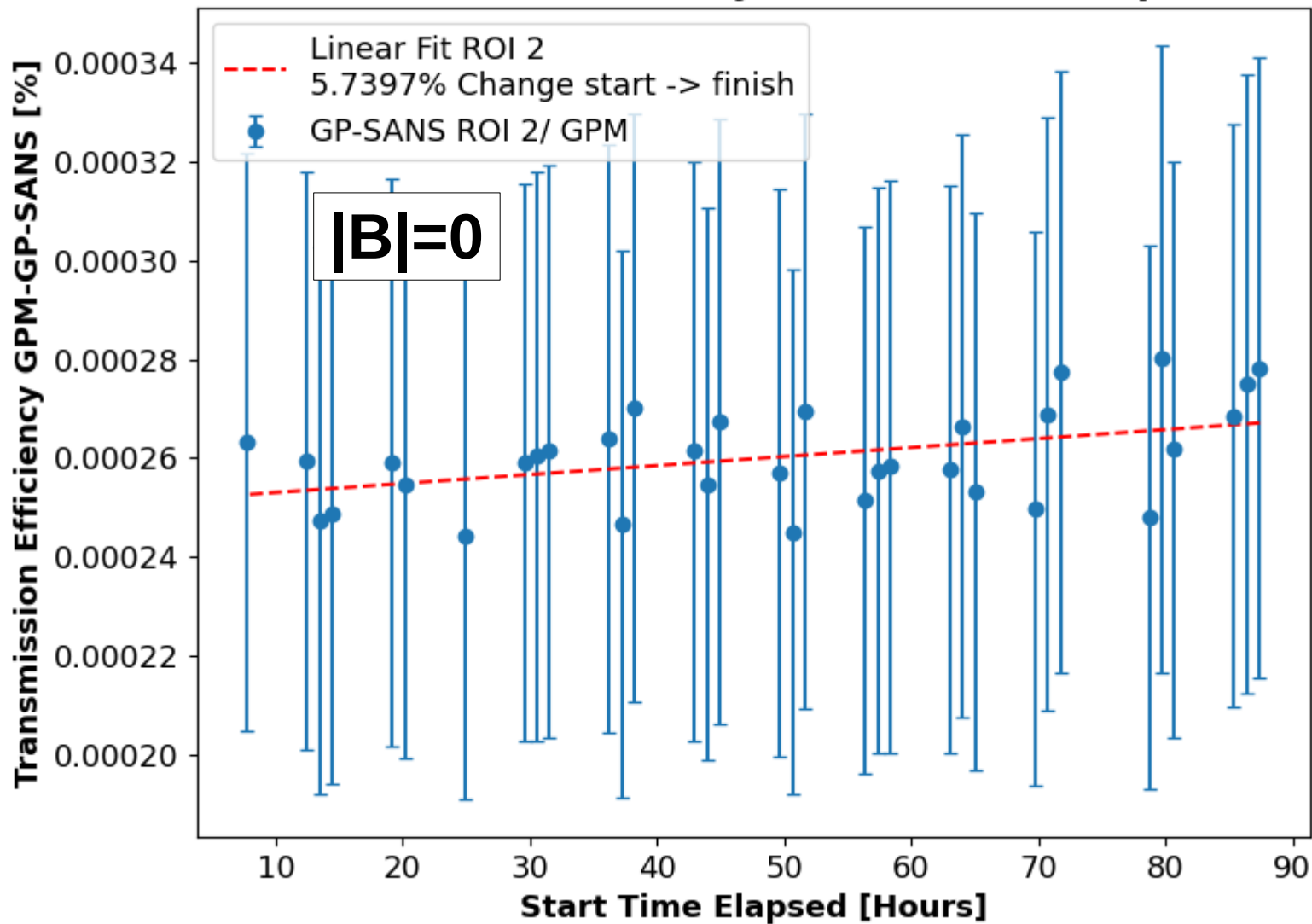
# Transmission Efficiency vs. Start Time Elapsed



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# Transmission Efficiency vs. Start Time Elapsed



# 1e8 GPM Simulated Intensity Spectrum

