

## Agenda:

1. Linus and Nathan 15' discussion of pictures for PRD paper
2. Charlie and Kyle 10' discussion of fast neutron spectrum
3. Yuri 5' guide transmission for fast neutrons
- ~~4. Mubi 10' updates from UKY (travelling to India)~~
5. AOB

# Simulation of $n \rightarrow n'$ probabilities for PRD paper

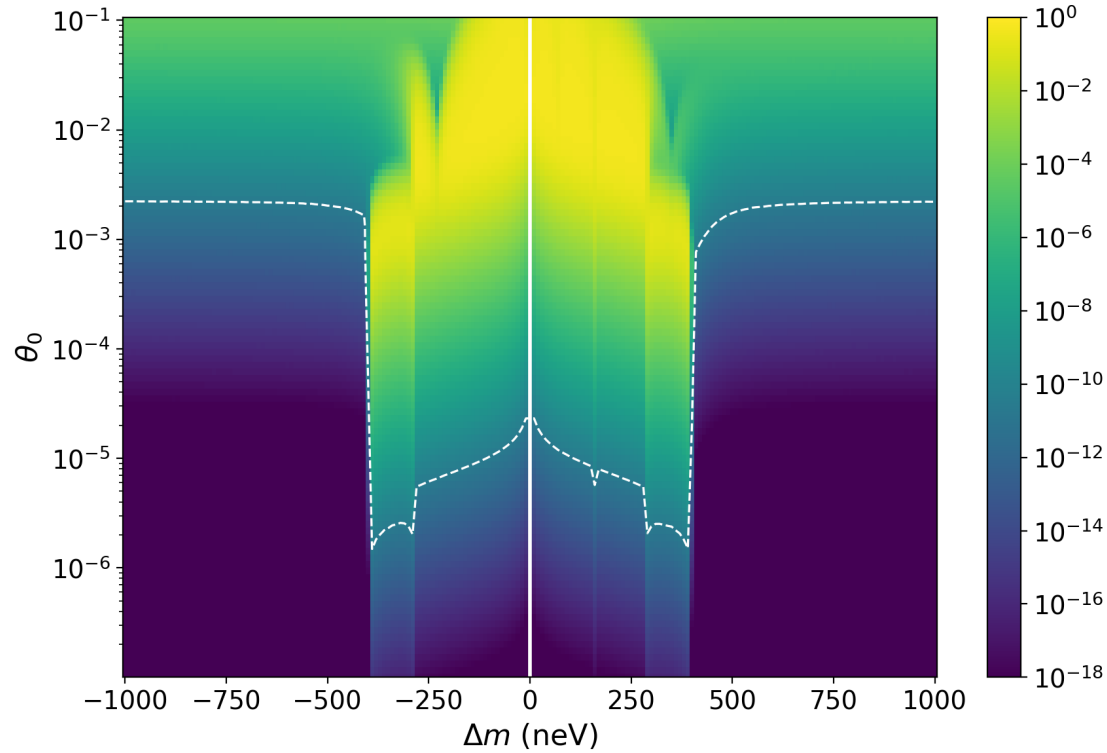
2026-04-28

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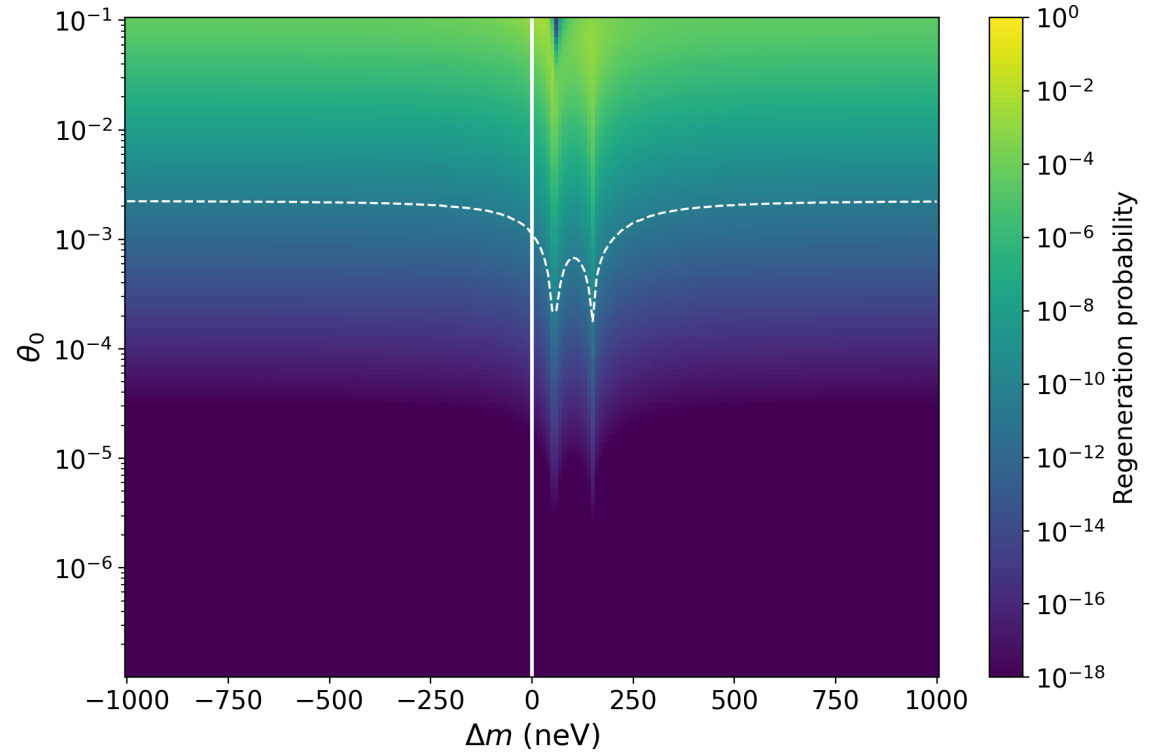


# New simulations for $B=0.003$ T

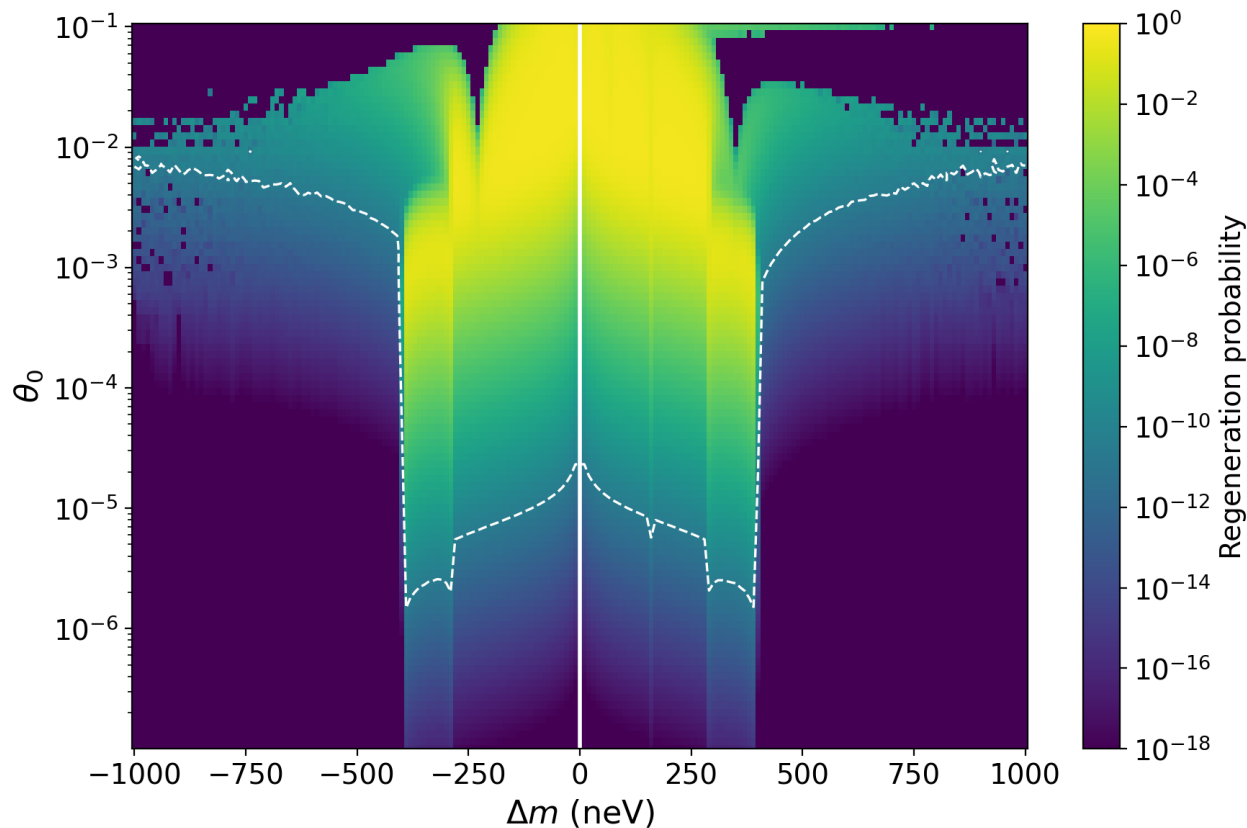
$B = 4.8$  T



$B = 0.003$  T



# Difference in probability



- Negative values are clipped to lowest plotted probability.
- Rounding errors probably significant (subtracting two nearly identical numbers).
- Should we rerun with double precision (will take some time)?
- It seems butterfly plots in previous papers are for regeneration probability of single field, not including background subtraction.

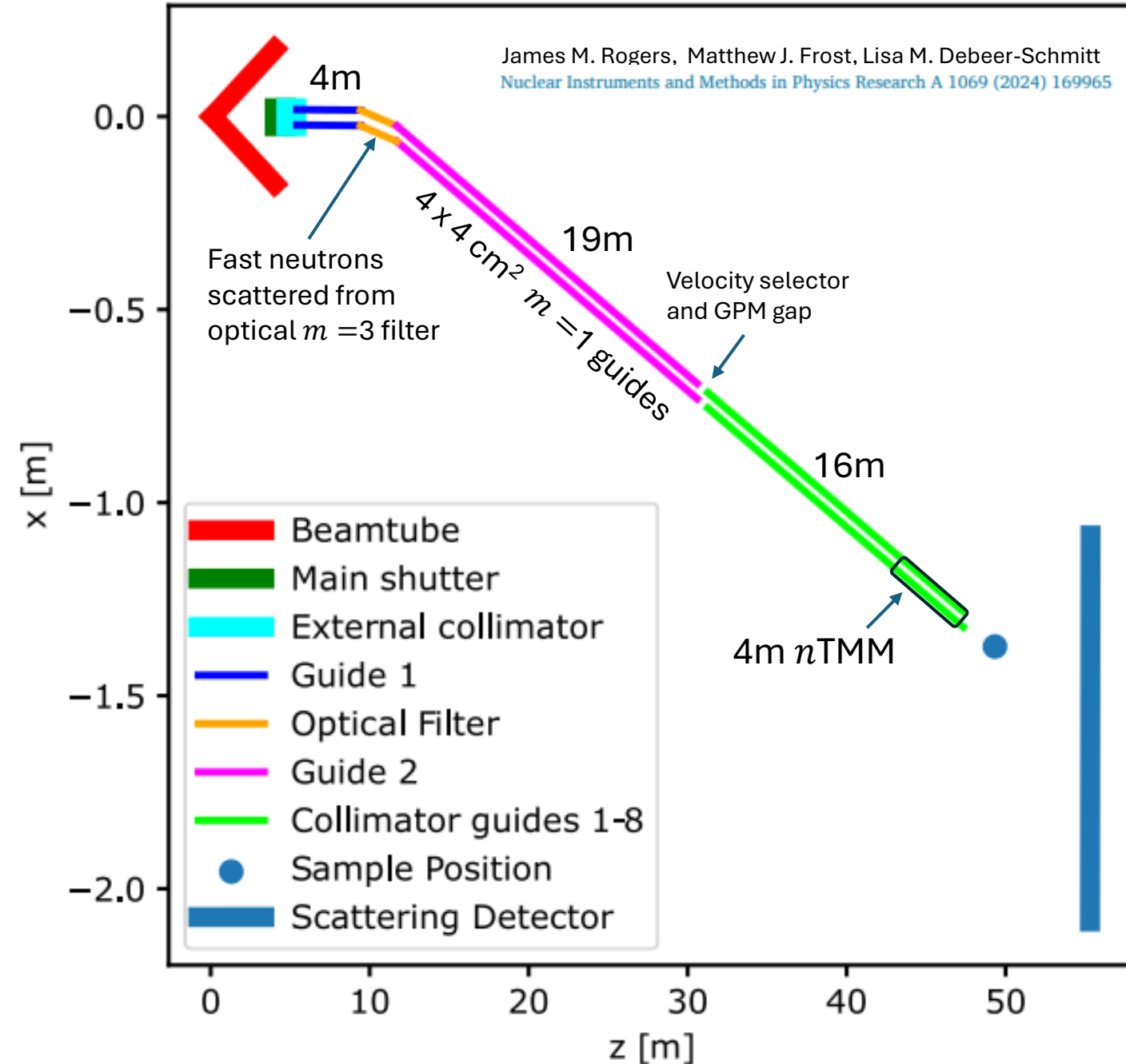


Rough estimate of CG-2 guide transmission vs neutron energy

Yuri Kamyshev

# X Projection

James M. Rogers, Matthew J. Frost, Lisa M. Debeer-Schmitt  
 Nuclear Instruments and Methods in Physics Research A 1069 (2024) 169965

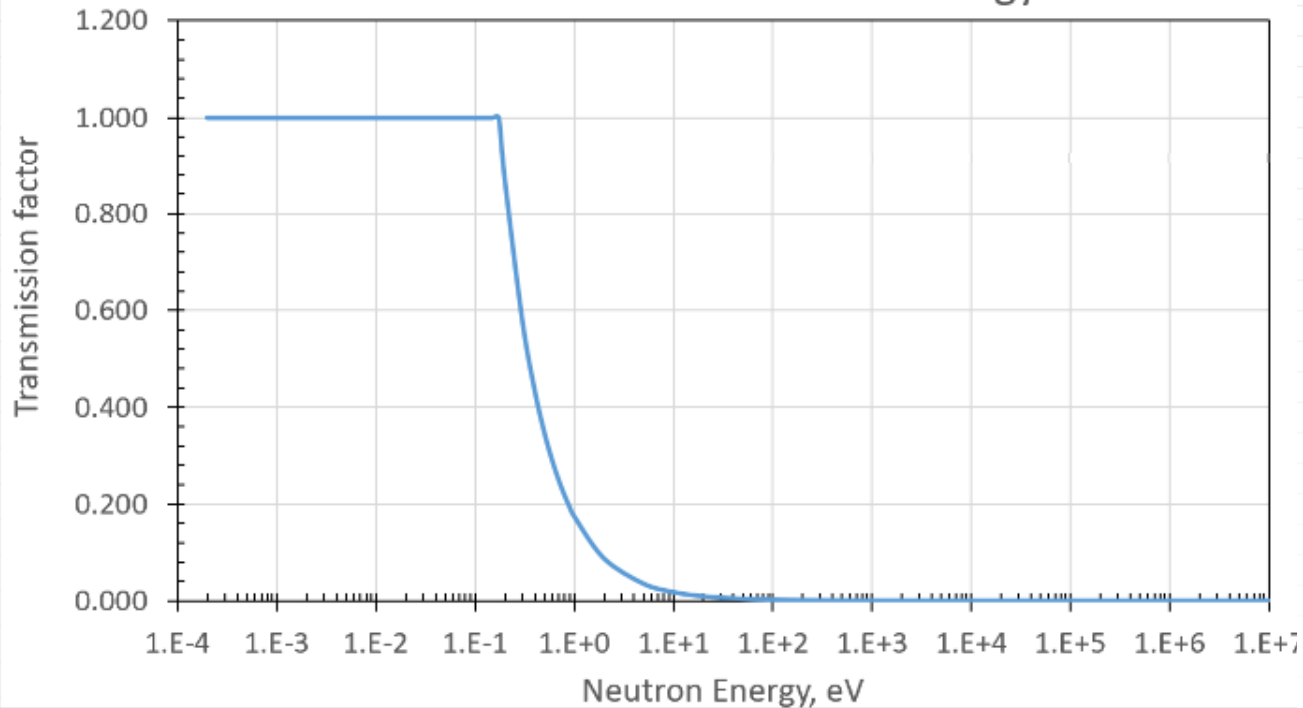


## HFIR CG-2 Beam line

- Cold neutrons  $\lambda = 4\text{\AA}$  have  $v = 1000\text{ m/s}$
- $m = 1$  guide transports neutrons with  $v_{\perp} \lesssim 7\text{ m/s}$
- regular transmission guide angle  $\delta_T \lesssim 7\text{ mrad}$
- Minimal angle transported by  $\sim 33\text{-m}$  guide  
 $4\text{ cm}/33\text{m} \approx 1.2\text{ mrad}$  (single reflection)
- It corresponds to  $E_n \approx 175\text{ meV}$ , i.e.  $\lambda = 0.7\text{\AA}$
- Larger neutron energies can be transported if they are entering guide at smaller angles;
- their solid angle (acceptance) is reducing  $\sim 1/E$
- When not transported, flux of fast neutrons can be reduced by the ratio of solid angles at enter and exit of 32-m guide (19+1+12 m)
- Assuming that source of scattered neutrons is 1 m from the guide entrance
- then fast neutron transmission is  $\approx 1/1000$
- then we can construct the transmission factor as function of neutron energy

Lin scale

Guide transmission vs neutron energy



Log scale

Guide transmission vs neutron energy

