Agenda:

1. Linus & Nathan - Update on calculations for PRD paper 10'
2. Mubi - Update from UKY 10'
3. Linus - Update from LU 10'
4. Discussion need for tech. review of changes with pressure control and borated poli installation 5'
5. Carolyn update on measured fast neutron intensity (central peak) 10'
6. AOB 5'

Simulation of Schrödinger equation evolution using different initial conditions

2026-03-31

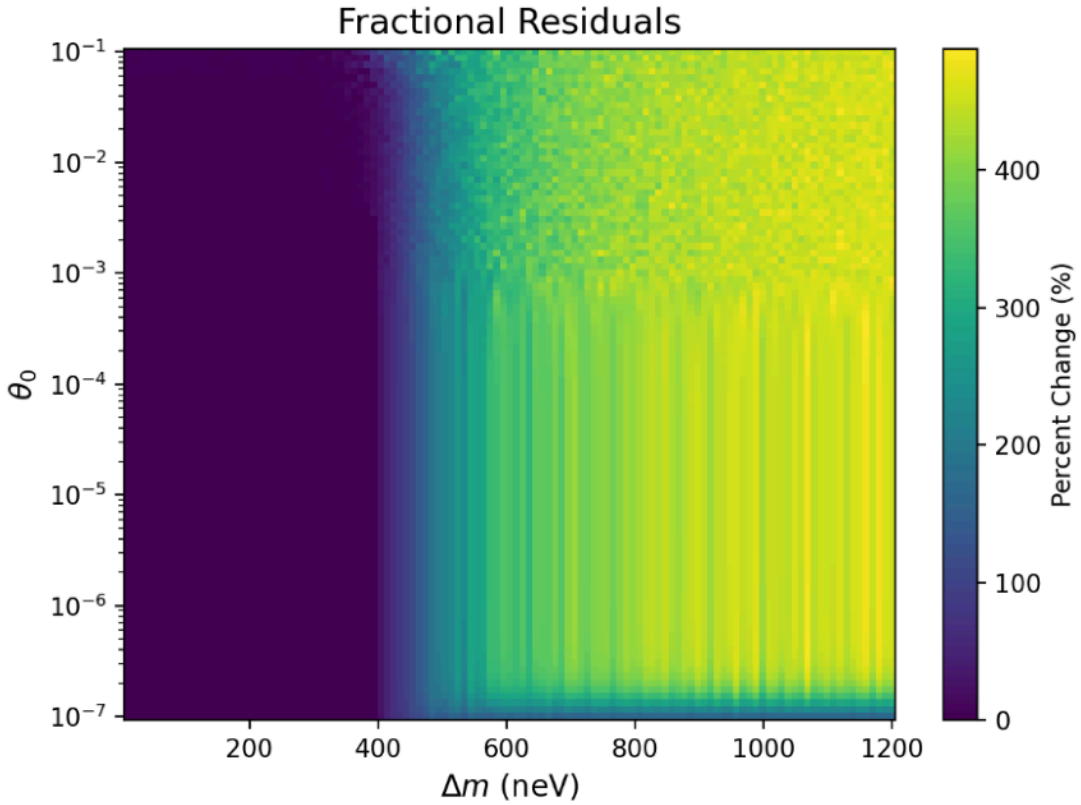
linus.persson@fysik.lu.se

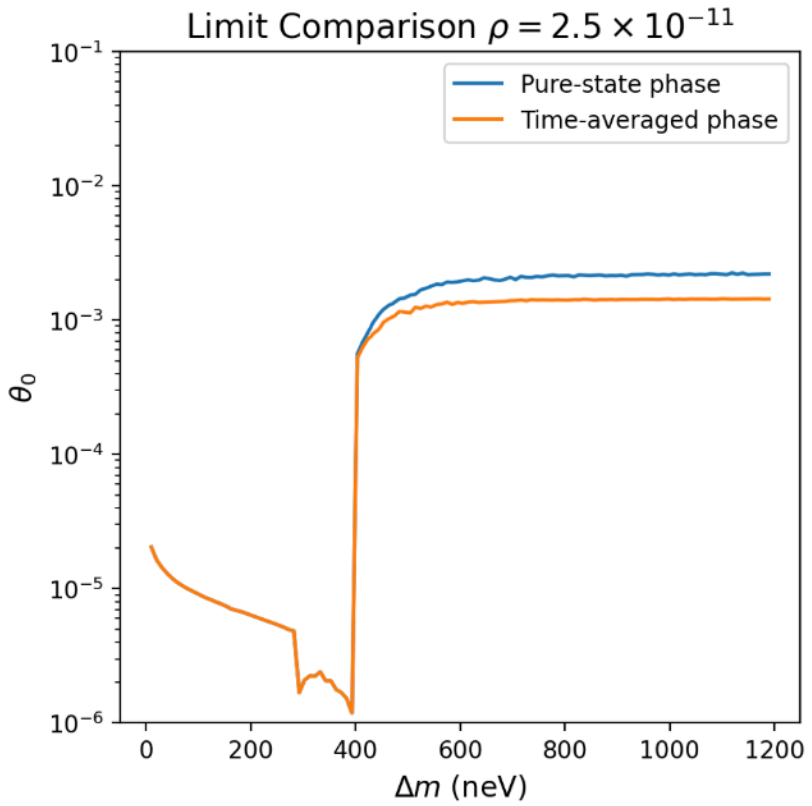
LUND UNIVERSITY

Recap: Pure vs initial phase state evolution

Time-averaged phase: $\psi_{\text{init}} = \begin{pmatrix} 1 - 2\theta_0^2 \\ 2\theta_0^2 \end{pmatrix}$

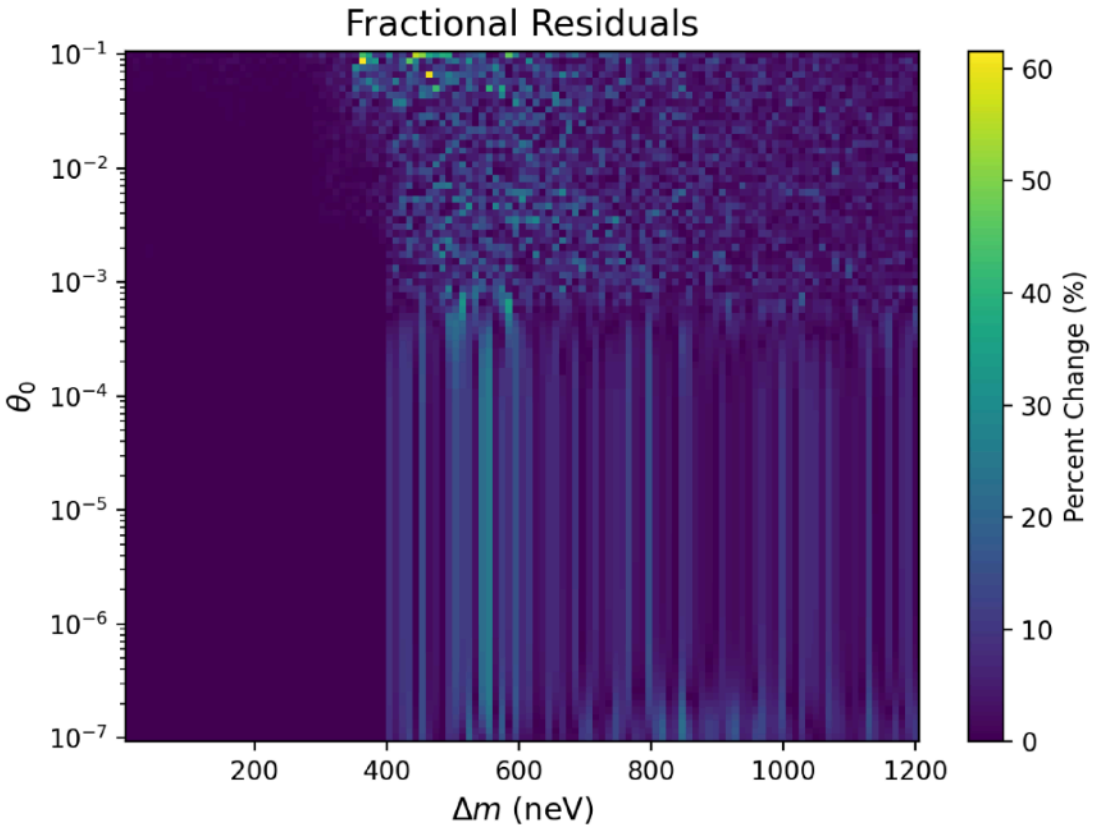
Single pure phase: $\psi_{\text{init}} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$

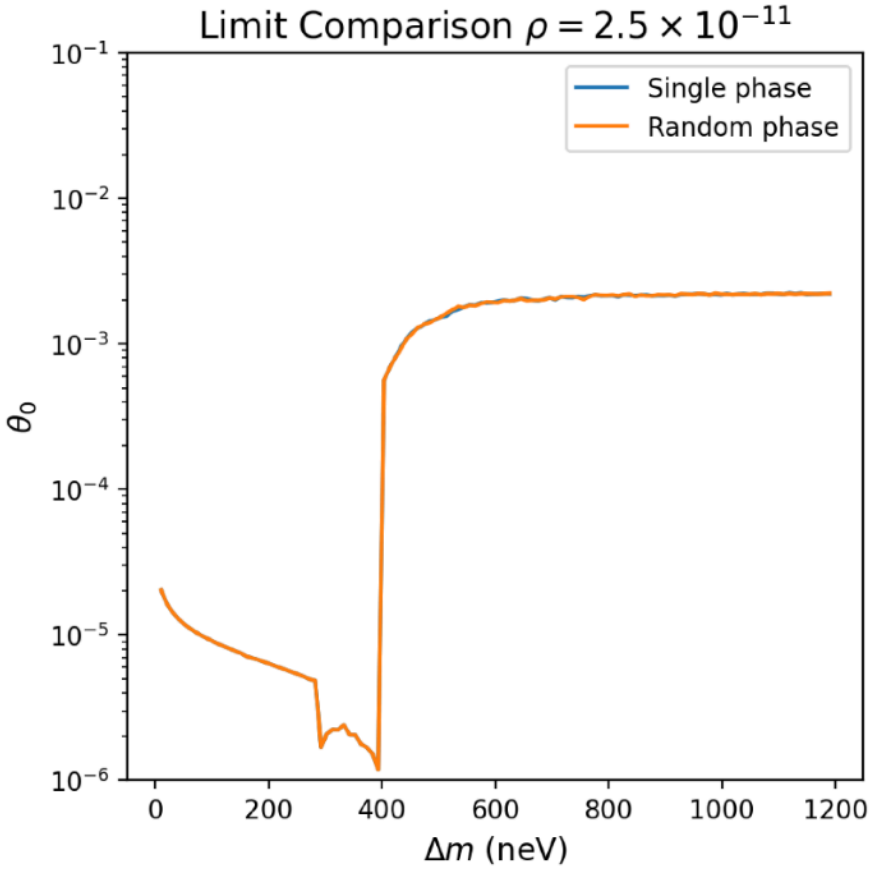




New test: Pure vs random phase state evolution

Single pure phase: $\psi_{\text{init}} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$ Random phase: $\psi_{\text{init}} = \begin{pmatrix} \cos^2\theta_0\, e^{-i\varphi/2} + \sin^2\theta_0\, e^{i\varphi/2} \\ \cos\theta_0 \sin\theta_0 \left(-e^{-i\varphi/2} + e^{i\varphi/2}\right) \end{pmatrix}$ for $\varphi \sim U(0,2\pi)$





100 velocities/phases per point

Next steps

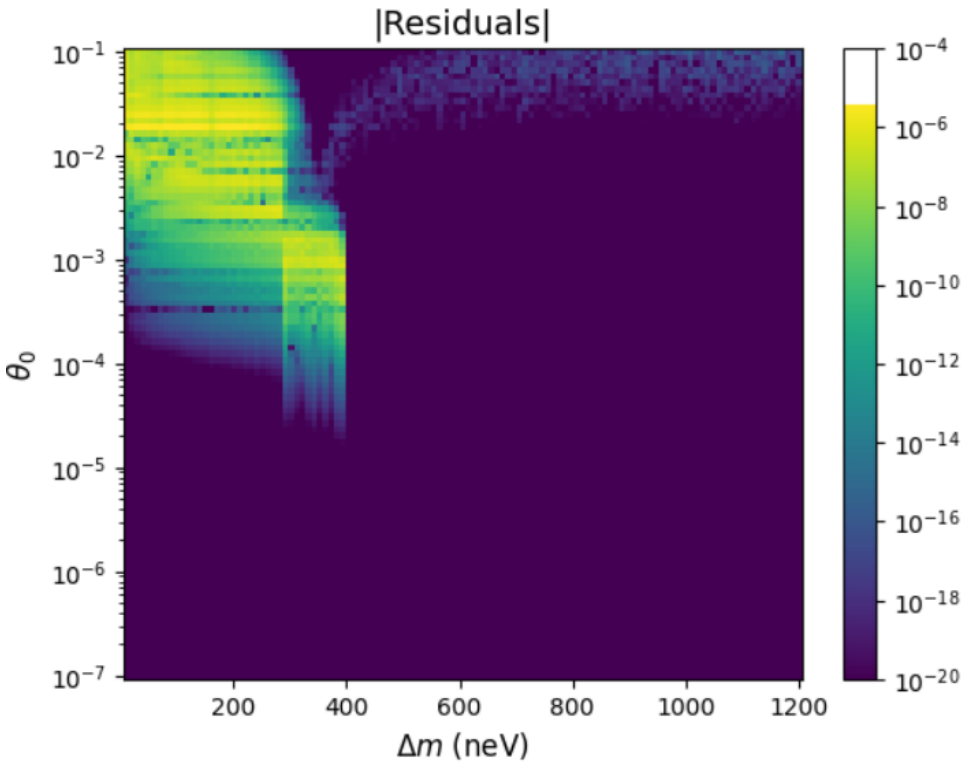
- Nathan had some concerns regarding the positioning of different materials for the input.
- Plan for running simulations:
  1. Two Δmranges, 10-1000 neV (linear scale), 0.06-20 neV (log scale).
  2. Positive and negative Δm.
  3. Positive and negative polarisations.
  4. Three magnetic field strengths (2.4 T, 3.6 T, 4.8 T).
- 24 simulations (?) needed
- Should we stick to step size 30 μm and 2000 velocities as previous papers?
- Will start during Easter, shouldn't take more than a few weeks depending on node availability on COSMOS.

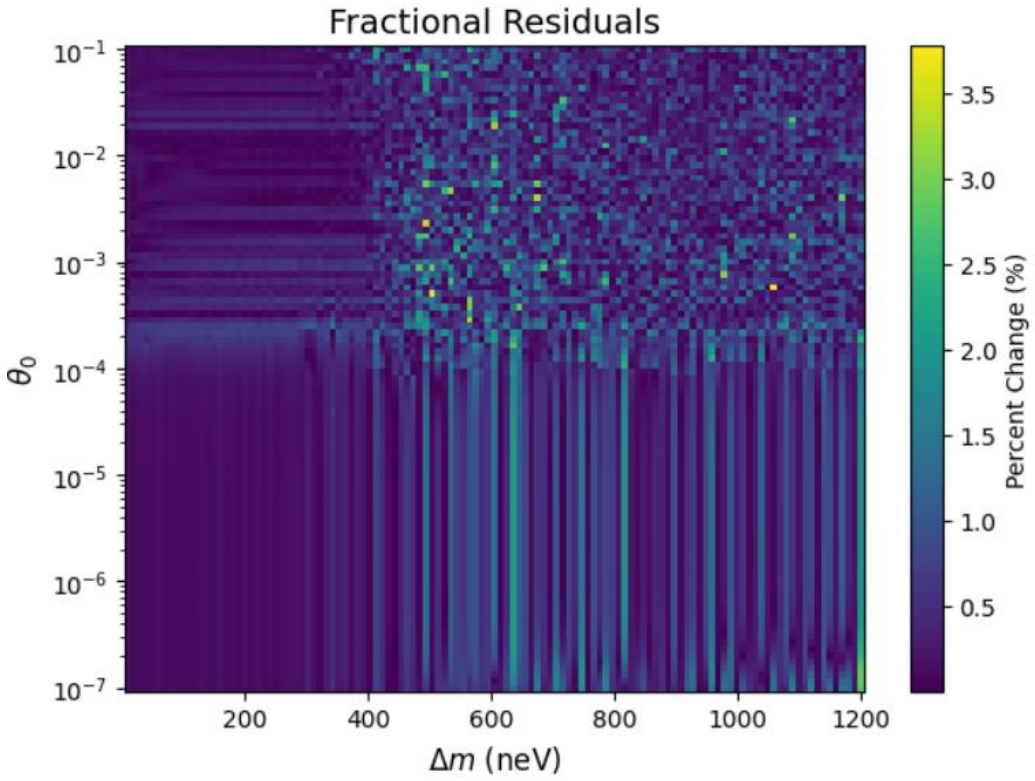
LUND UNIVERSITY

Nathan - some updates

Single vs double precision

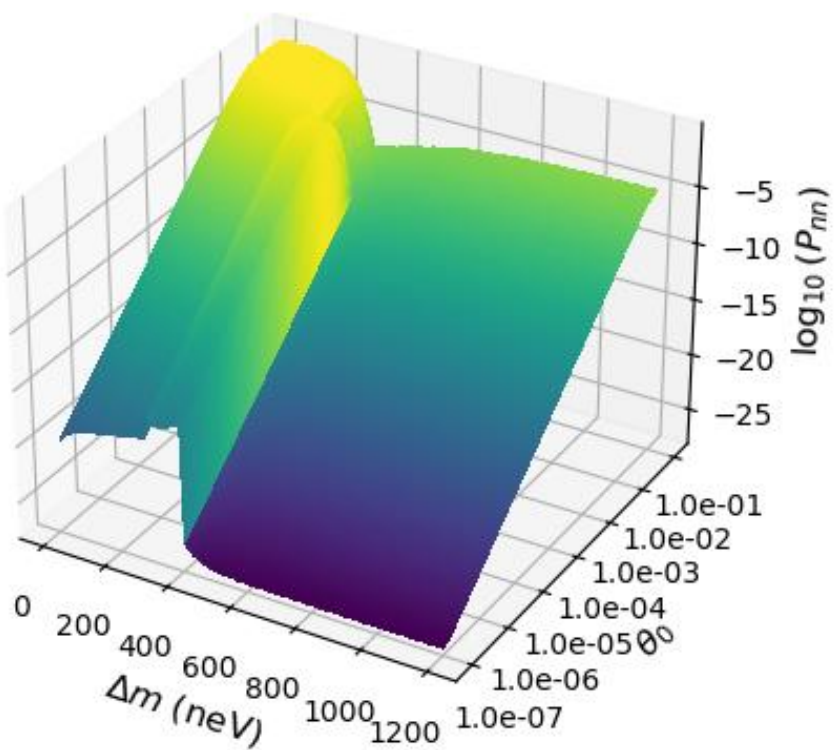
- 3x speedup
- Virtually no change in results (<3%)

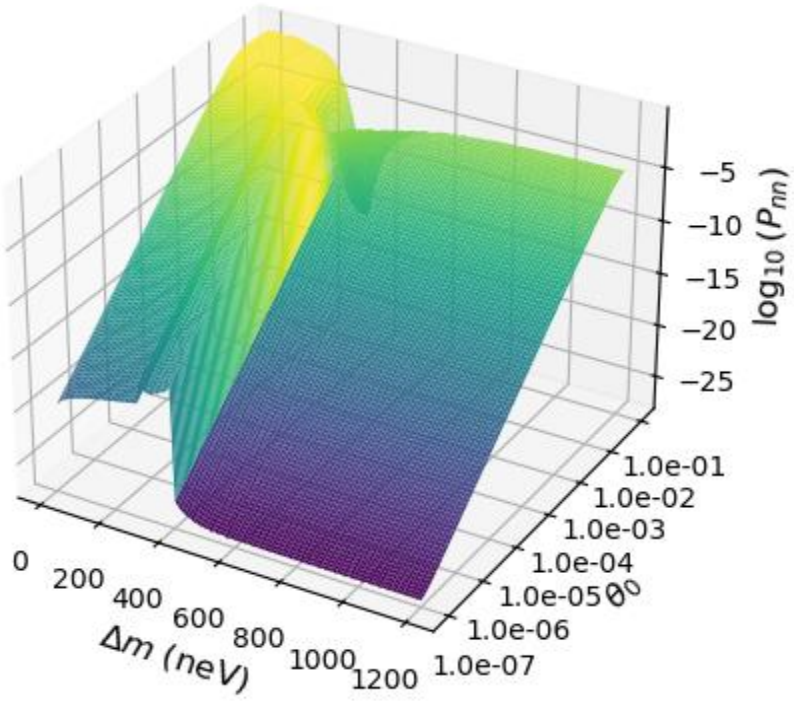




3D plots

- Not terribly enlightening



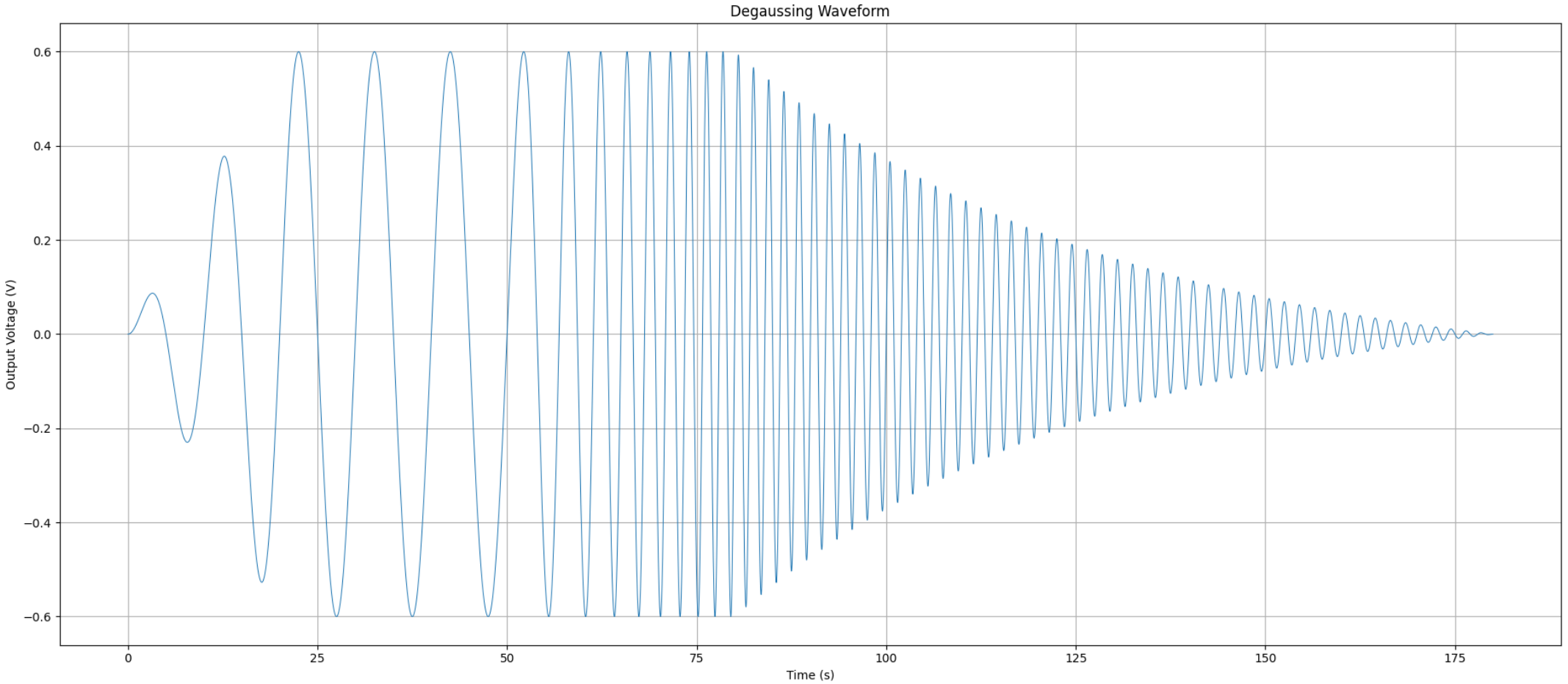


Mubi Khan

University of Kentucky

March 31, 2026

t_{ramp} t_{hold} t_{sweep} t_{decay}



MSR room profiles

For 20 sec ramp time, 30 sec hold, and 30 sec sweep, and 100 sec decay

$V\_pp\ (Volts)$	$freq\ (Hz)$	$final\ freq\ (Hz)$	SF
0.88	0.5	0.5	292
0.5	0.1	0.5	162
0.5	0.1	1.0	24
0.5	0.01	0.3	23

Peak Intensity

Carolyn Haviland, UTK, 3/31/26

Process

- Look at x projection
- Decide where to separate background and peak
- Find average background in y
- Integrate peak in y
- Correct by GPM factor
- Divide by duration for intensity

Whole Table

Run	Time (s)	Counts	Background	SD	Background Intensity	SD	Peak (normalized)	SD	Correction Factor	Peak Intensity	SD
Reference (253)	1800	13175	88.3372093023256	19.9409885225335	0.0490762273901809	0.0110783269569631	5088.96511627907		1	2.82720284237726	
BN – 231	1800	7095	69.4233750745379	15.1755460322279	0.0385685417080766	0.00843085890679328	754.861138194178		1.00043516100957	0.419367298996766	
One shutter – 385	1814.728806	7679	71.0038759689923	15.7512334942108	0.0391264390217611	0.00867966246093236	1178.37498598372		1.00813843675351	0.64933943963841	
Two shutters – 386	5581.550409	18842	199.353658536585	38.9384207403959	0.03571653822478	0.00697627323720116	196.992815076003		3.10070736810918	0.0352935655222895	

Run	Time (s)	Counts
Reference (253)	1800	13175
BN – 231	1800	7095
One shutter – 385	1814.728806	7679
Two shutters – 386	5581.550409	18842

Basics
- Run (and material)
- Duration
- Counts

Background	SD	Background Intensity	SD
88.3372093023256	19.9409885225335	0.0490762273901809	0.0110783269569631
69.4233750745379	15.1755460322279	0.0385685417080766	0.0084308589067933
71.0038759689923	15.7512334942108	0.0391264390217611	0.0086796624609324
199.353658536585	38.9384207403959	0.03571653822478	0.0069762732372012

Background
- Two wings averaged
- Error
- Intensity
- Error

Currently

Peak (normalized)	SD	Correction Factor	Peak Intensity	SD
5088.96511627907		1	2.82720284237726	
754.861138194178		1.00043516100957	0.419367298996766	
1178.37498598372		1.00813843675351	0.64933943963841	
196.992815076003		3.10070736810918	0.035293565522289 5	

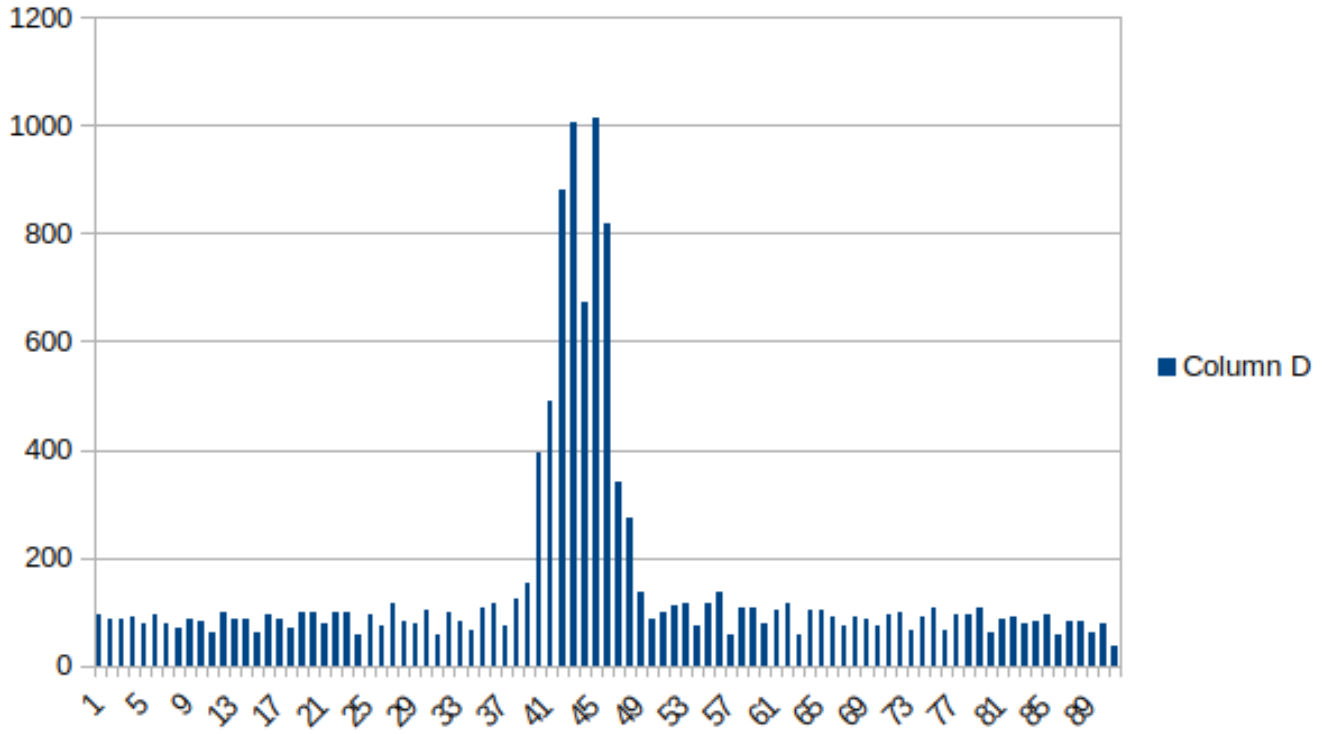
Peak calculations

- Normalized by GPM
- Error
- GPM correction
- Intensity
- Error

- Peaks are with background subtracted

Sanity check

- Ratio of peak intensity to background intensity is 0.386
- Y plane
- Visually makes sense to me
- Talked about values of 0.5?



https://www.amazon.com/dp/B0FXXFP497?ref=ppx_yo2ov_dt_b_fed_asin_title

Mini Camera - 4K HD Wireless Small Camera - Tiny Indoor Security Cameras with Night Vision & Motion Detection, APP Control Nanny Cam for Home, Office, Baby, Pet Monitoring, Miniguard Cam, 2.4GHz WiFi

Brand: Bnhdons

4.0 ★★★★☆ (66) | Search this page

400+ bought in past month

Lowest price in 30 days

-5% $37.99

List Price: ~~$39.99~~ | Price history

Recommended Uses For Product	Baby Monitoring, Indoor Security, Pet Monitoring
Brand	Bnhdons
Model Name	JW8688
Connectivity Technology	Wireless
Special Feature	HD Resolution, Motion Sensor, Night Vision, Portable

Mini Video HD Camera for Pressure readout

1.93 x 1.5 x 0.67 inches

Image from the phone

Camera at the distance 24”

Need to try at short distance ~ 6"