

Discussion of DOE/NP Research Plan

August 16, 2022, YK
Update Sept. 6, 2022
NN' Zoom meeting

- Small grant from DOE/NP is in place starting August 1, 2022-end July 31, 2024
- Means that our research is officially DOE supported !
- To ORNL it gives small operational money
- To UT support for a Graduate Research Assistant – **Cary Rock**
- We need a plan of 2-year project development including
 - analysis of existing data
 - repeat mag-H experiment at GP-SANS
 - new experiment to measure n TMM at GP-SANS
 - plans for future experiments
- How to pursue collaboration with ESS/NNbar/HIBEAM?

That was proposed to DOE for 2 year by quarters

	 2/2 2022		1/2 2023		2/2 2023		1/2 2024	
Task	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
GP-SANS Characterizations	X	X						
Search for Δm effect			X					
Analysis of Δm effect				X	X	X		
Calculation of n TMM effect	X	X	X	X				
Search for n TMM effect					X			
Analysis of n TMM effect						X	X	X
Future program design study					X	X	X	X

Table 1: Proposed Schedule for Project

Included in the Proposal

1. Analysis of existing SNS & HFIR data

Devyn + Cary

Will need to address STEREO result (progress report in Cary's talk today)

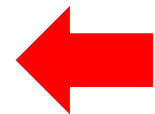
Intensity simulation progress will be reported today by YK

Should we set the goal date for finishing analysis?

Should we start writing paper for PRD?

Matt: existing HFIR data can be also used although background was not stable ← no manpower to look at that

Frank: Overleaf page for draft next paper: <https://www.overleaf.com/read/cyzqxpfdbjw>



Included in the Proposal

2. Experiment at GP-SANS with mag-H and Cd absorber

? When can we have beam time?

ESS (PhD student of Valentina) would like to participate. When?

We need a renewal new proposal by Sept. 21 (Matt)

Beam configuration (full spectrum, collimation)

Did we conclude/understood intensity calibration? (repeat Au?)

What other improvement we can make? (new mask, detector protection)

? Background with higher detector thresholds? Bkgr. vs det. position

Matt planned HFIR beam characterization paper. What is the status?

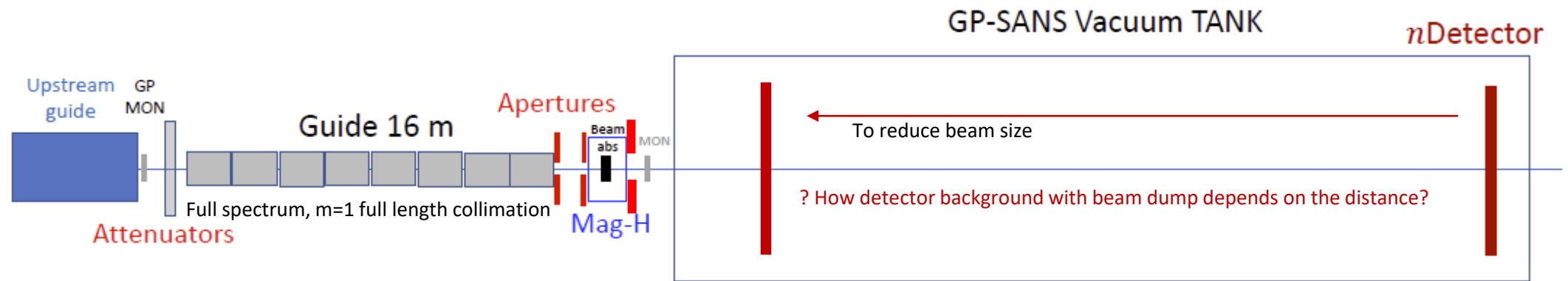
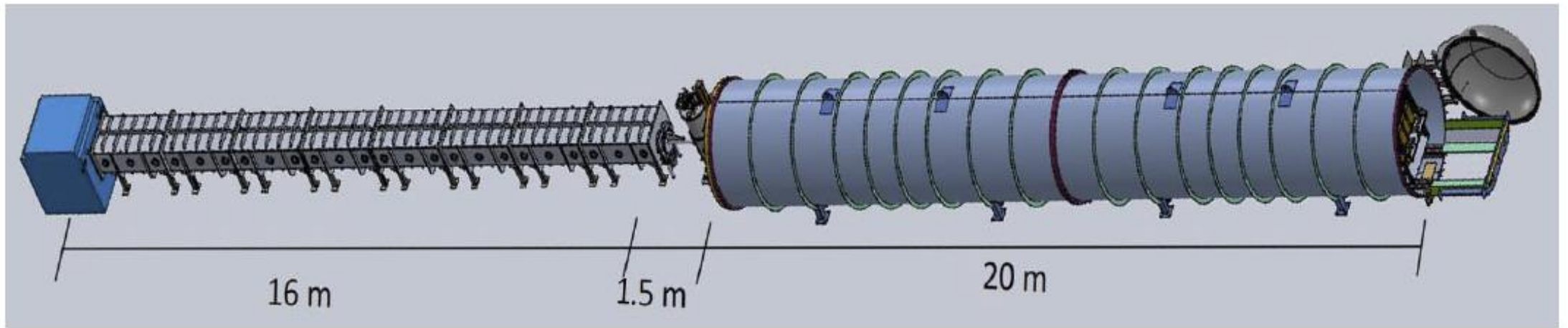
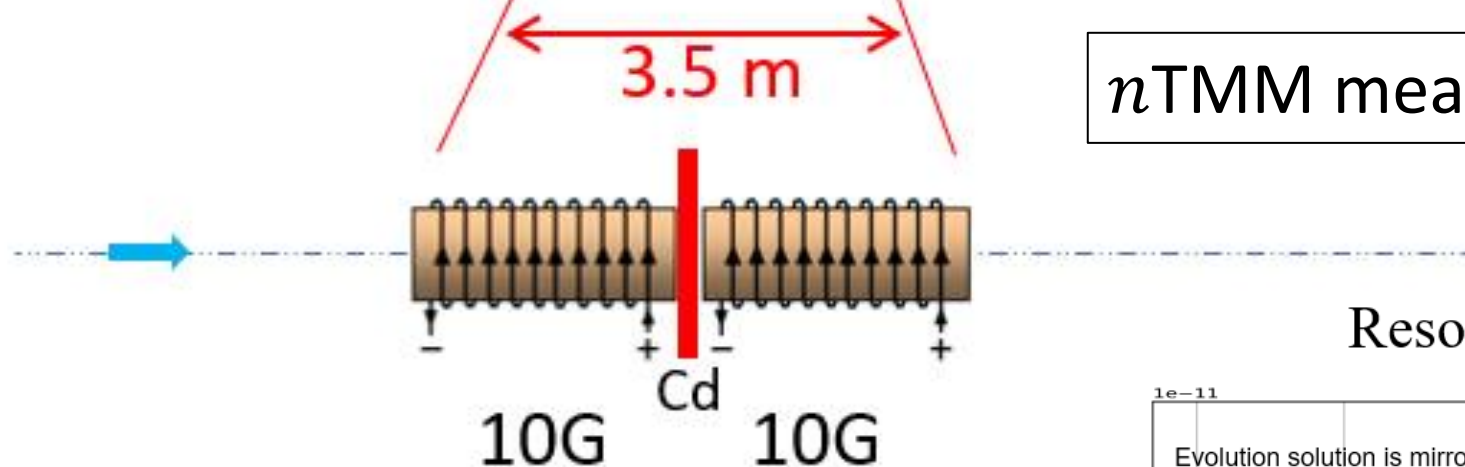
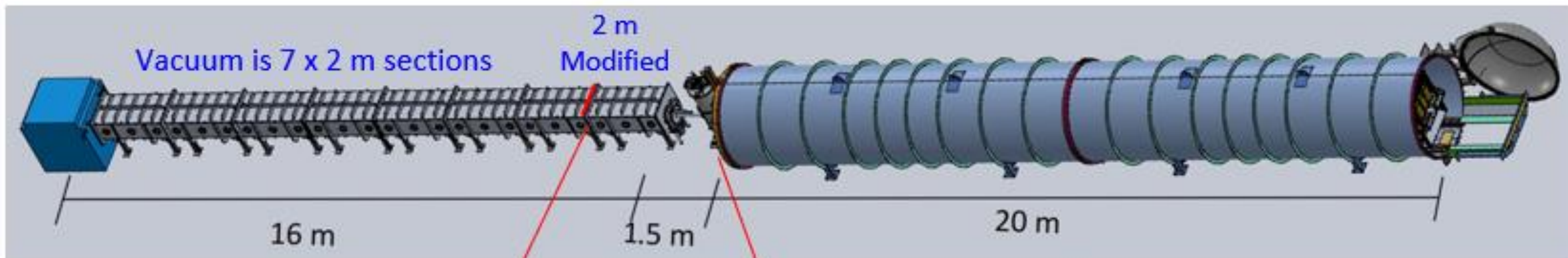


Figure 5: Layout of the proposed experiments at GP-SANS, described in the text.

Included in NP Proposal

3. Experiment at GP-SNAS for n TMM measurement

- How can we build “experimental table” replacing the last section of beam guide?
Design (NP funds, seed money for engineering).
Construction at UT shop (money for materials $\leq \$30K$ are available)
- Design of the 10 G magnets. Simulation of sensitivity (Kanan Wise + Cary)
- Will need Cd plate of $\sim 200 \times 200 \times 3.5$ mm³ covering magnet aperture (L.H.)
- Stable computer controlled 10A current supply for magnets (?)
- Tracking air density (P, T, H₂O, O₂) (?)
- When can we have beam time?
- When we need to submit a new proposal for n TMM ?
- What other improvements we can make?



n TMM measurement scheme

$$H = \begin{pmatrix} V_F - |\mu B| & \epsilon \pm \kappa \mu B \\ \epsilon \pm \kappa \mu B & 0 \end{pmatrix}$$

Resonance, second tube

