

Using 4m M4 Transmissions to Reduce 12m SANS Data

SMK, 11/06/13

Test Data

3m (M3)

Z:/Masks/MASKSANS2D_114D_3m4m_Wolff_A2=12mm.txt

SANS: 11421 TRANS: 11426 DIRECT: 11425

4m (M4)

Z:/Masks/MASKSANS2D_131K_4m_8mm_Handley_Sidhu.txt

SANS: 18505 TRANS: 18505 DIRECT: 18506

Z:/Masks/MASKSANS2D_131L_4m_12mm_Lakey_B.txt

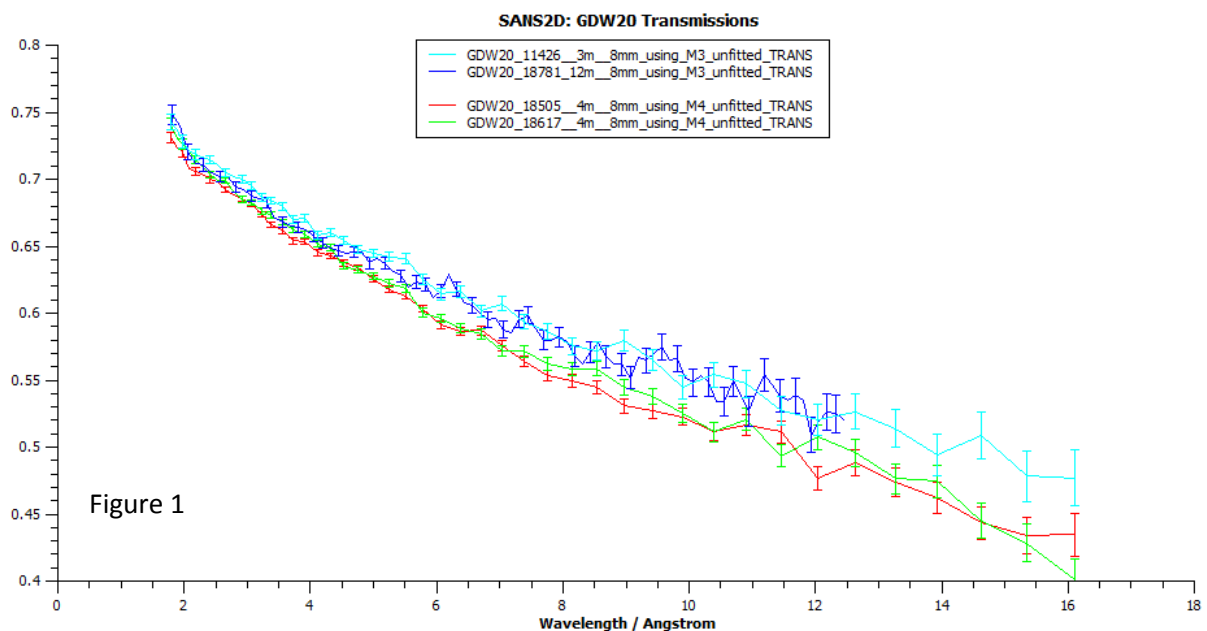
SANS: 18617 TRANS: 18617 DIRECT: 18618

12m (M3)

Z:/Masks/MASKSANS2D_131M_12m_8mm_Adams.txt

SANS: 18783 TRANS: 18781 DIRECT: 18780

Normally Calculated Transmissions



With increasing wavelength, M4 increasingly *undercalculates* transmission relative to M3, probably due to a combination of:

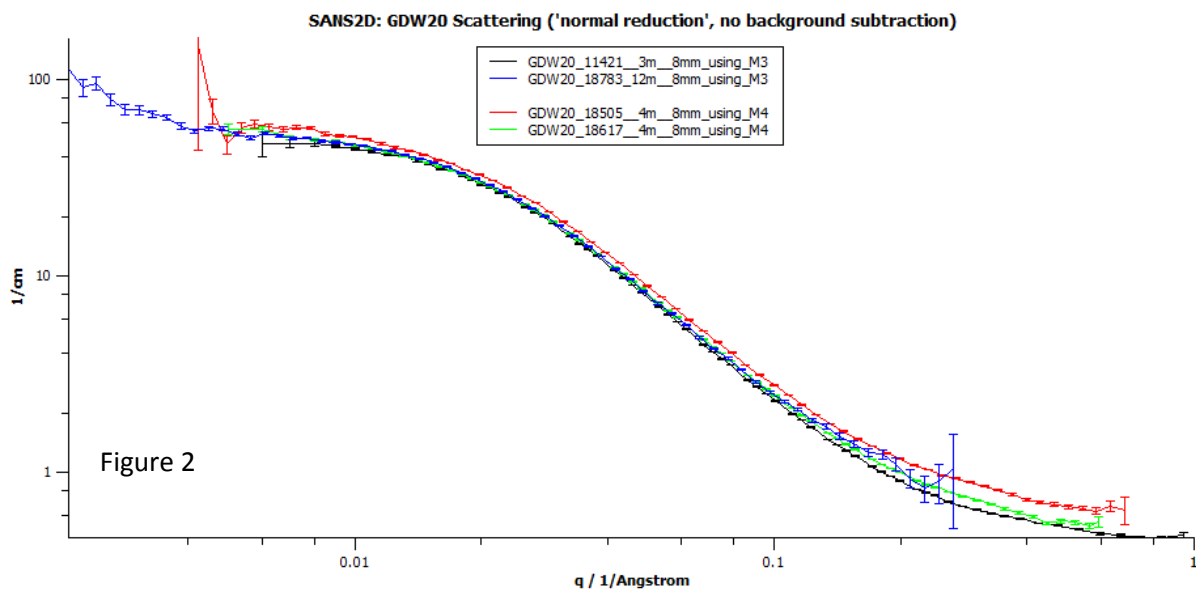
- differences in scintillator efficiency
- differences in solid angle subtended by the scintillator chips

- differences in the amount of small-angle scatter recorded

See work in progress by RKH.

Normally Reduced SANS

In the following plot the data has been reduced in the 'normal manner' using the specified transmission monitor. Normalisation is to M2 at 3m and 4m, but to M1 at 12m. No background scattering has been subtracted.



The question that arises is, can the 12m data be reduced using a 4m transmission? This would be of interest because at present standard practice is to use M3 for transmissions at 12m, requiring 'LOQ-like' *separate* scattering and transmission runs which, because of the low count rate at 12m, eats up a lot of valuable time.

Alternatively Reduced SANS

The test is whether the following works:

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Z:/Masks/MASKSANS2D_131M_12m_8mm_Adams.txt
SANS: 18783  TRANS: 18617  DIRECT: 18618
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with:

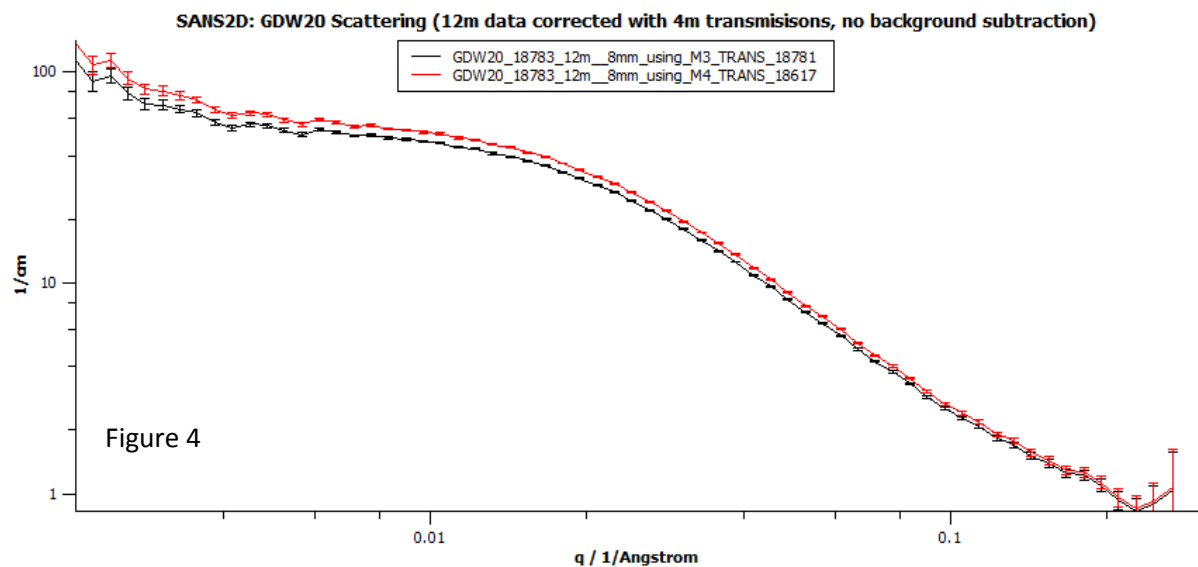
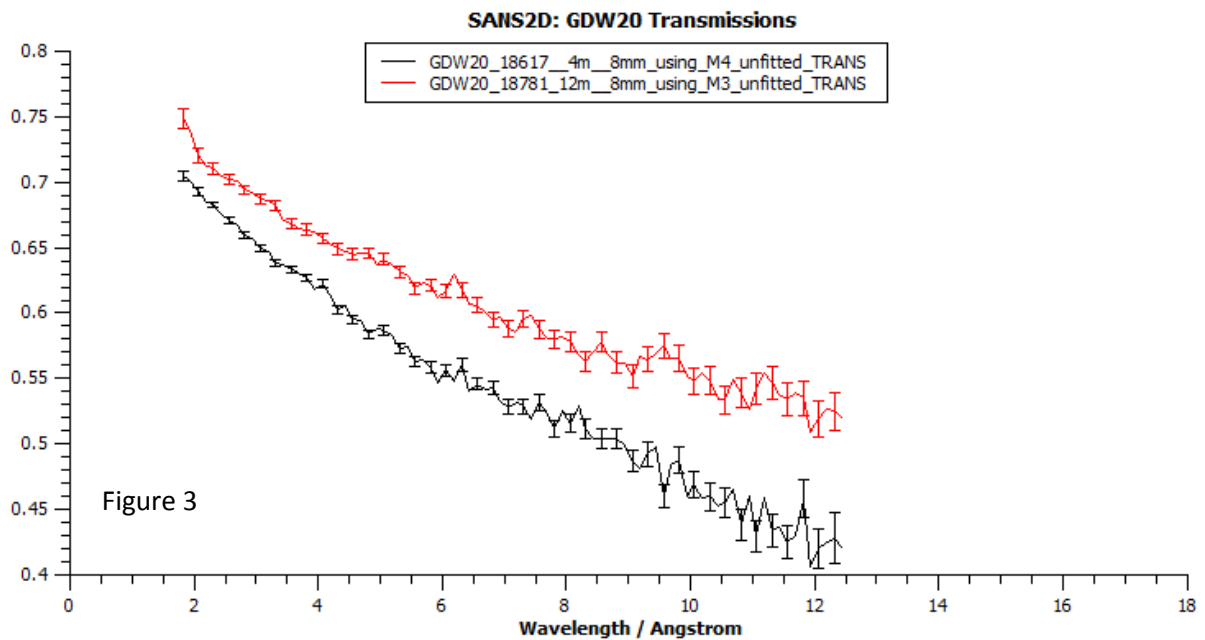
Analysis Details → Incident Monitors → For transmissions: 2, interpolated

It does not work (but is promising)! The scattering is corrected ok, and has the right shape, but the intensity is too low. The reason is that Mantid calculates transmission values >1 because the 12m user file has told it to look for M3 and not M4! This cannot be changed from the GUI so it is necessary to edit the user file.

This gives a revised test:

Z:/Masks/MASKSANS2D_131M_12m_8mm_Adams_using_4m_TRANS.txt

SANS: 18783 TRANS: 18617 DIRECT: 18618



Which looks ok, but on close inspection the 4m M4 transmission in Figure 3 is seen to be slightly lower, with a slightly different wavelength dependence, to its 'normally calculated' value in Figure 1. Why?

This variation in transmission then impacts the Q-dependence of the reduced SANS data.