

Experiment Planning

- Scattering Length Density Calculation
- Instrument Configurator (SASCALC)
- Scattering Simulation

Scattering Length Density Calculation

D₂O

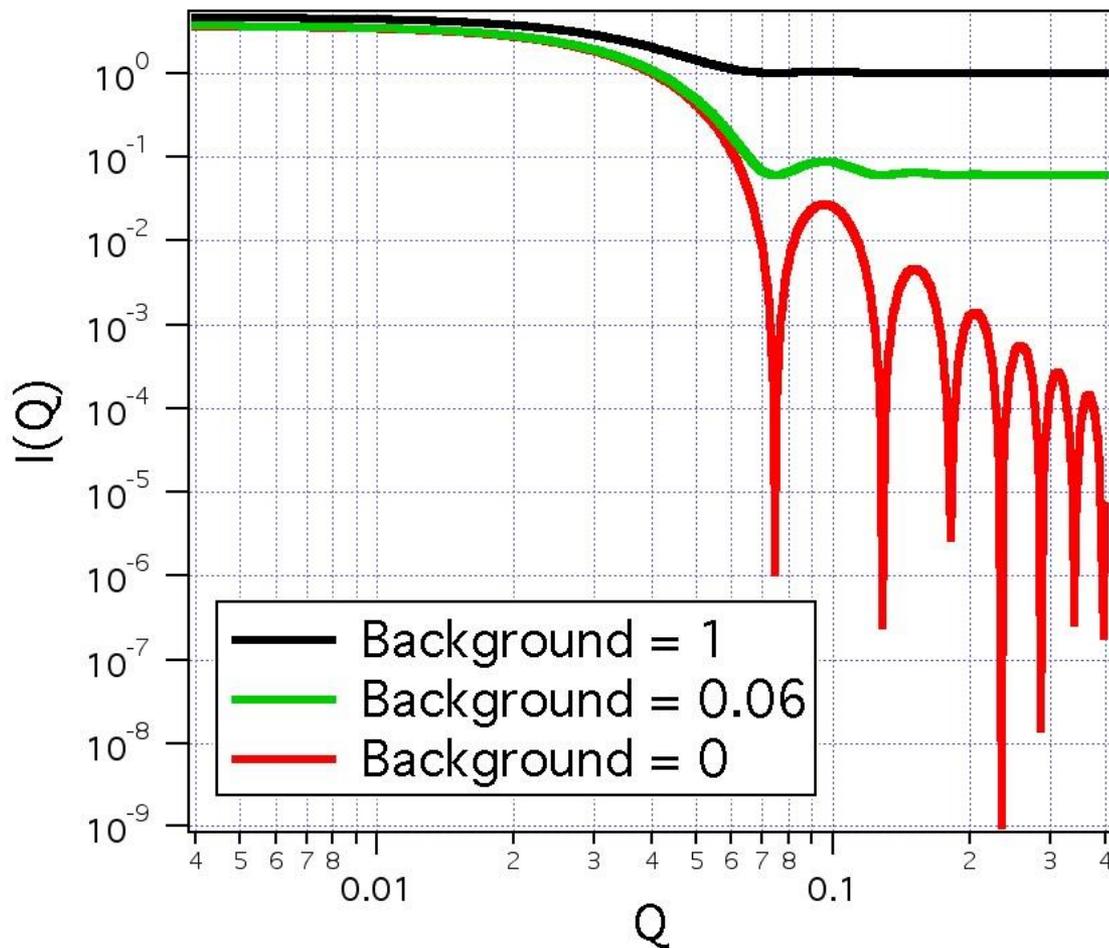
Compound	D2O
Density (g/cm ³)	1.1
Wavelength (Å)	6
<input type="button" value="Calculate"/>	
Neutron SLD	6.33E-6 (Å ⁻²)
Cu Ka SLD	9.36E-6 + 2.98E-8i (Å ⁻²)
Mo Ka SLD	9.33E-6 + 5.59E-9i (Å ⁻²)
Neutron Inc. XS	0.138 (cm ⁻¹)
Neutron Abs. XS	1.35E-4 (cm ⁻¹)
Neutron 1/e length	1.549 (cm)

SDS

Compound	CH3C11H22SO4Na
Density (g/cm ³)	1
Wavelength (Å)	6
<input type="button" value="Calculate"/>	
Neutron SLD	3.33E-7 (Å ⁻²)
Cu Ka SLD	9.23E-6 + 5.4E-8i (Å ⁻²)
Mo Ka SLD	9.19E-6 + 1.16E-8i (Å ⁻²)
Neutron Inc. XS	4.46 (cm ⁻¹)
Neutron Abs. XS	0.0656 (cm ⁻¹)
Neutron 1/e length	0.2207 (cm)

<https://www.ncnr.nist.gov/resources/activation/>

Model Predictions - Simple Sphere



In H_2O :
 $I(0)/bkg \sim 4$

In D_2O :
 $I(0)/bkg \sim 60$

Instrument Configuration

SASCALC:

Igor Macros / tools on the web

- Estimate size of the micelles as spheres
- Where in Q-space is the scattering happening?
- $R \sim 22 \text{ \AA}$ $Q_{\min} < 1/R \sim 0.04 \text{ \AA}^{-1}$
- Pick an instrument setting to cover this Q-range

Instrument Configuration Simulation

SASCALC

Instrument

NG3 NG7

Huber Chamber

5.08 cm

1/2"

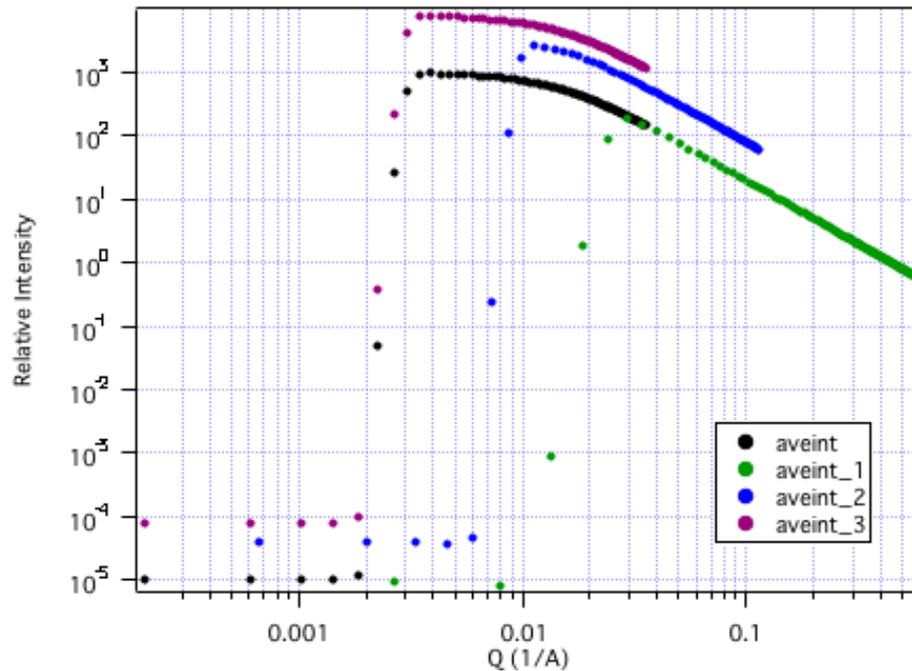
Det Dist (cm) 1300

Offset (cm) 0

Lambda 6 0.115

Lenses? Simulation?

Freeze Clear ? Done



Trial_Configuration

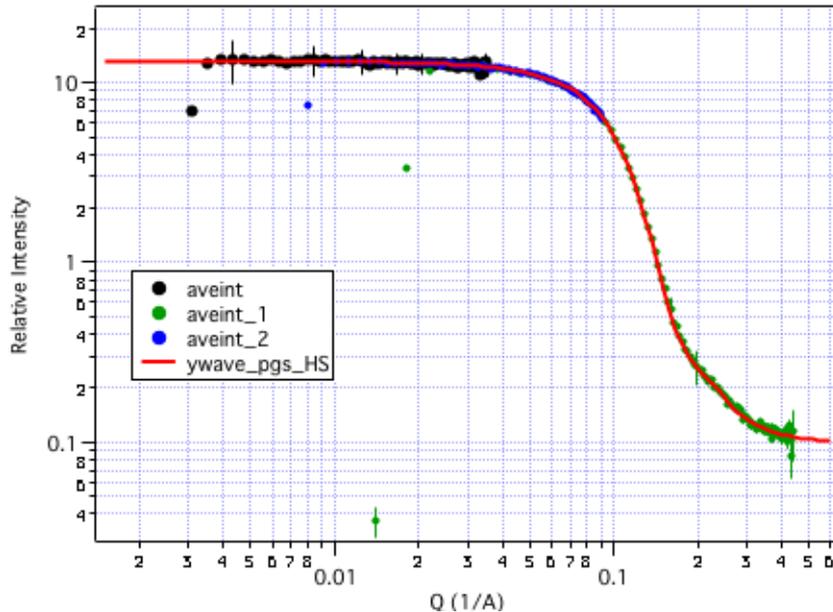
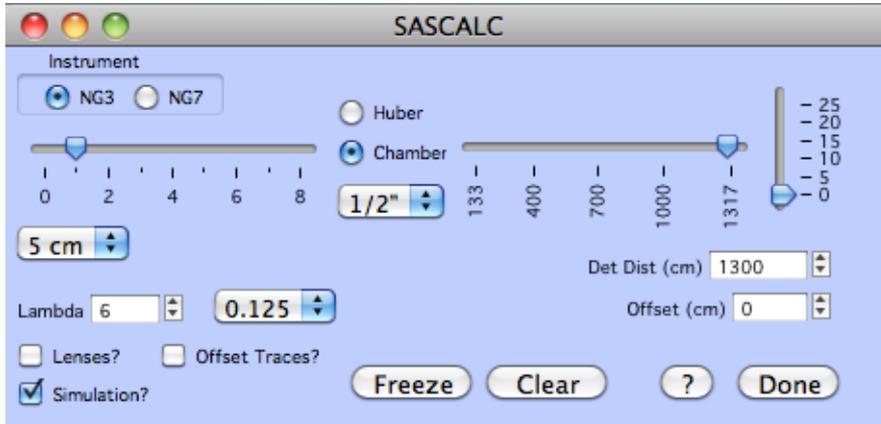
Source Aperture Diameter = 5.08 cm
Source to Sample = 1472 cm
Sample Aperture to Detector = 1305 cm
Beam diameter = 7.24 cm
Beamstop diameter = 3.00 inches
Minimum Q-value = 0.0036 1/Å (sigQ/Q = 29.7 %)
Maximum Horizontal Q-value = 0.0258 1/Å
Maximum Vertical Q-value = 0.0258 1/Å
Maximum Q-value = 0.0364 1/Å (sigQ/Q = 5.5 %)
Beam Intensity = 379570 counts/s
Figure of Merit = 1.37e+07 Å²/s
Attenuator transmission = 0.0138 = Atten # 5
***** NG 7 *****

Sample Aperture Diameter = 1.27 cm
Number of Guides = 1
Sample Chamber to Detector = 1300.0 cm
Sample Position is Chamber
Detector Offset = 0.0 cm
Neutron Wavelength = 6.00 Å
Wavelength Spread, FWHM = 0.115
Sample Aperture to Sample Position = 5.00 cm
Lenses are OUT

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Predicted Count Rate

300 seconds at each distance



SDD(m)	#Guides	Counts/s
13	1	930
5	5	12000
1	8	93000

(for 10 % SDS in D₂O)
1m - 5 min OK (attenuate?)
5m - pretty good as is
13m - 20 minutes is better

<http://www.ncnr.nist.gov/>

- SANS Homepage
 - **Calculation tools**
 - Nuclear properties
 - Manuals & Tutorials
 - **Reduction and Analysis**
 - Video tutorials
 - Instrument information
 - Available Equipment
 - User Laboratories
 - Access information!
 - Proposal information
 - **Monetary Assistance**
 - Summer School notices
- [/programs/sans
/resources/index.html](/programs/sans/resources/index.html)
- </resources/n-lengths>
- </programs/sans/data/index.html>
- [**/programs/sans/data/red_anal.html**](/programs/sans/data/red_anal.html)
- /programs/sans/data/movies/reduction_analysis_movies.html
- /programs/sans/sans_inst.html
- </programs/sans/equipment/index.html>
- </userlab>
- </access.html>
- </beamtime.html>
- [**/outreach.html \(Support for first time users!\)**](/outreach.html)
- </summerschool>
-
- [**/staff/hammouda/the_SANS_toolbox.pdf**](/staff/hammouda/the_SANS_toolbox.pdf)
(Almost everything you could need!)

• The SANS Toolbox

