Last updated: 8/22/2011

This document contains information to reproduce the figures used in transmission experiment documentation.

**File Name Convention**: phase\_experiment type sample #\_trans\_rot.fig

* phase: gel phase, ripple phase, fluid phase etc.
* experiment type: g=glancing, t=transmission, r=rotation
* sample # is found in the column called People in the picture log sheets. Note: 5.2 is denoted as 52 because “.” is not acceptable for a variable name in MATLAB.
* rot means the CCD image is rotated.
* trans means the figure is constructed by transforming from CCD to q-space. See Useful Matlab Commands.
* he means data is collected with helium inside the chamber.

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For gel\_g pictures, refer to glancing.docx for raw data files used

File name Matlab command or Origin project name

gel\_g10.fig cshow(gel\_g10,[0 500])

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For gel\_t52 pictures, refer to transmission.docx for raw data files used and mathematical adjustments applied to produce figures.

File name Matlab command or Origin project name

gel\_t52.fig show(gel\_t52,[0 150])

gel\_t52\_trans.fig qshow(qr\_1800,qz\_1000,gel\_t52\_trans,[0 200]);

gel\_t52\_rot\_trans.fig qshow(qr\_1800,qz\_1000,gel\_t52\_rot\_trans,[0 200]);

gel\_20peak\_qrplot1.fig qrplot(gel\_t52\_trans,[960 1040]);

gel\_20peak\_qrplot2.fig qrplot(gel\_t52\_rot\_trans,[960 1040]);

gel\_20peak\_qrplot1.tif produced in Origin 8.0. See gel\_20peak\_qrplots.opj

gel\_20peak\_qrplot2.tif produced in Origin 8.0. See gel\_20peak\_qrplots.opj

gel\_t52\_smpl.fig cshow(gel\_t52\_smpl,[0 3700]);

gel\_t52\_bkgnd.fig cshow(gel\_t52\_bkgnd,[0 3700]);

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For gel\_g52 pictures, refer to transmission.docx for raw data files used to produce figures.

gel\_g52\_20.fig cshow(gel\_g52\_20,[0 120]);

gel\_g52\_22.fig cshow(gel\_g52\_22,[0 80]);

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For gel\_r pictures,

gel\_r

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For ripple\_g9 and ripple\_g10 pictures,

ripple\_g10.fig show(ripple\_g10,[50 1500]) 11058-11064

ripple\_g9.fig show(ripple\_g9,[0 300]) 11116-11117

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For ripple\_t52 pictures, refer to transmission.docx for raw data files used and algebraic adjustments applied to produce figures.

ripple\_t52\_rot\_trans.fig

ripple\_t52\_1.txt qrplot(ripple\_t52\_rot\_trans,[960 1040]);

ripple\_t52\_2.txt qzplot(ripple\_t52\_rot\_trans,[1465 1505]);

ripple\_t52\_3.txt qrplot(ripple\_t52\_rot\_trans,[1200 1280]);

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For ripple\_t52\_he pictures, refer to transmission2.docx

Ripple\_t52\_he.fig

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ripple\_r

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Refer to transmissionSubstrate.docx to find out raw data files used to produce figures.

File name Matlab command or Origin project name

noGlass\_t\_he.fig show(noGlass\_t\_he,[0 800]);

noGlass\_t.fig show(noGlass\_t,[0 2400]);

glass\_t\_he.fig show(glass\_t\_he,[0 1200]);

glass\_t.fig show(glass\_t,[0 1200]);

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Refer to leveling.docx to find out raw data files used to produce figures.

Leveling\_np1.fig cshow(leveling\_np1,[0 80]);

Leveling\_0.fig cshow(leveling\_0,[0 80]);

Leveling\_pp1.fig cshow(leveling\_pp1,[0 80]);

Leveling\_pp2.fig cshow(leveling\_pp2,[0 80]);

Leveling\_0\_1.fig cshow(leveling\_0\_1,[0 80]);

Leveling\_pp1\_1.fig cshow(leveling\_pp1\_1,[0 80]);

Leveling\_pp2\_1.fig cshow(leveling\_pp2\_1,[0 80]);

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Refer to AgBeh.docx to find out raw data files used to produce figures.

AgBeh\_rot.fig cshow(AgBeh\_rot,[0 250]);

AgBeh\_22.fig cshow(AgBeh\_22,[0 250]);

AgBeh\_n28.fig cshow(AgBeh\_n28,[0 1200]);

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These ps images are created in tview program using print plot function. Click File at the top left corner. Four images are plotted together. The images used are sc\_0535.img (red), sc\_0536.img (green), rt\_0219.img (blue), and rt\_0210 (cyan). Respectively, the experimental configurations are no substrate without helium, no substrate with helium, glass cover slip with helium, and glass cover slip without helium.

GlassScatteringQrplot1.ps qrplot, averaged over 20 pixels, cursor at y=286 (beam position)

GlassScatteringQrplot2.ps cursor at y=500

GlassScatteringQrplot3.ps cursor at y=926

GlassScatteringQzplot1.ps qzplot, averaged over 20 pixels, cursor at x=71 (beam position)

GlassScatteringQzplot2.ps cursor at x=500

GlassScatteringQzplot3.ps cursor at x=1000

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How to save qrplot and qzplot as a text file:

How to produce gel\_20peak\_qrplot1.tif in Origin 8.0 from gel\_20peak\_qrplot1.fig (Matlab file): to transfer data from Matlab to Origin, we need to save plot data as a text file. To do this, follow Matlab commands below.

>> temp=qrplot(gel\_t52\_trans, [960 1040]);

% gel\_t52\_trans is a local variable. It is a 2001 by 1801 matrix and represents a scattering intensity map

%in q-space after an intensity profile in a CCD space is transformed in a transmission experiment. temp

%is a row vector with 1801 elements containing intensity values in qr direction averaged between

%the 960th and 1040th element.

>> temp=temp’;

% ‘ command transposes a vector. temp becomes a column vector.

>> qr\_1800\_temp=qr\_1800’;

% qr\_1800 is a qr label from 0 A^-1 to 1.8 A^-1 in step of 0.001 A^-1. It is a row vector with 1801

%elements so need be transposed.

>> A=[qr\_1800\_temp temp];

% A is an 1801 by 2 matrix.

>> save gel\_20peak\_qrplot1.txt A –ASCII

% Creates gel\_20peak\_qrplot1.txt. Now, import this file to Origin 8.0 for nice graphing and fitting, etc!

**Useful Matlab Commands**

Transformation from CCD to q-space:

\*[qr,qz,gel\_t52\_trans]=xz2qrqzfig3(gel\_t52,77,739,s,lambda,45,0.068,[0 150],2.5,1);

\*\*[qr,qz,gel\_t52\_trans\_rot]=xz2qrqzfig3(gel\_t52\_rot,104,773,s,lambda,45,0.068,[0 150],2.5,1);

s=105.48; lambda=1.5418;

**Miscellaneous Stuff**

Double precision uses 64 bits and single 32 bits.

“show” command uses global MaskD (pg10).