

INSTRUCTION MANUALS/GUIDES

1. Scan profile program

Called VINscan_profile_runningX8

This program continuously scans the intensity of a single line. The user can determine the following:

- Orientation (horizontally/vertically)
- Speed
- Sample distance
- Length of the line
- Position; the user can change the position of the scan real-time

Use: This program can be used to estimate the current spot size by scanning over a surface with a sharp intensity step.

Step by step instructions

1. First you set:
 - Sample distance (take a sample every 'sample distance' micron)
 - Length of scanline
 - Speed (max 250micron/s)
 - Orientation

Note: Make sure the sample rate is below 70Hz and the number of samples is below 220!

2. Make sure the DC signal is within the DC-Voltmeter (HP3457A) range.
3. Position the laser spot to the right place using the "STEPMOTOR" program
4. Hit the "Start Scanning" button to start scanning!
 - The intensity graph is given in the upper right graph
 - The derivative is given in the upper left and
 - the absolute value of the derivative is in the lower left graph with some peak detection options
 - Some smoothing filters can be applied if necessary
5. Push "Stop scanning" to stop! This button ensures that scanning will end at the same position it started.

2. Measure Kerr Hysteresis curves

Called Measure_kerr_all_hp3457A_next_switching2

This program can measure both Kerr ellipticity and Kerr rotation at different field values.

Use: This program is used to measure the Hysteresis of a particular sample (or spot on sample)

Step by step instructions

1. If you want to save the results you can set 'sample name' and 'operator name' and set 'save results' to 'yes'.
2. ADVANCED SETTINGS
 - a. You can change what is measured on which Lock-In-Amplifier (A or B).
 - b. Time constant of the Lock-in-amps and time between taking samples can be set, but most of the time you can leave these settings at their default value. (time between samples should always be greater than the time constant)
 - c. Put the resistor in series for smaller possible field steps. (about .25 Gauss with and .50 Gauss without).
 - d. You can set the step size used for building up the initial field.
 - e. Leave 'delete duplicate datapoints' checked.
3. Set "stepsize regions"
 - You can set the step size which is used to set the field for different regions and for both up and downward direction.
 - Normally you should choose one direction and use 'mirror values option'
 - a. Upward direction
Go from low to high and define the start field value, the end field value, and the step size that is used in between those values. Then define the next region (take the 'starting field value' of your last used 'end field value') so that they are connected.
4. make sure the used Gauss/Volt value is correct.. you can measure these values using the SCAN-SURFACE program.
5. Run program to start measuring

PICTURE

3. SCAN-SURFACE

Called Vinscan_surface_application12

With this program surface scans can be made using both Kerr Ellipticity and rotation at the same time (the DC intensity is also measured). The program also includes buttons that will start

1. the “Measure Kerr Hysteresis curves” program.
2. A surface scan viewer/editor

Step by Step instruction on how to make a surface scan

1. Press the ‘Measurement Points configuration’ button and enter:
 - which Gauss value to go to (always assume you start at zero)
 - and what stepsize is to be used
 - what kind of scan to make
 - 1: take on scan when the desired Gauss value has been reached
 - E: take a scan every step (smallest stepsize is about .25 with resistor/ .50 without resistor)
 - N: take no scan
2. Press the ‘Scan Surface – configuration’ button to
 1. Define the orientation scanning will take place
 2. Enter the length of the scanline, sample distance, scan speed(max 250micron/s), distance between scanlines and the number of scanlines (speed between scanlines should normally be the same as scan speed)
3. Hit ‘Scan Surface’ to start scanning

You should normally check if all the desired gauss values are reached correctly.. do this by selecting setting ‘number of scanlines’ to 1 and do a test run.

If you want to reach a desired value very accurately then go there slowly.

For taking consecutive scans with the smallest possible field interval use the ‘E’ (every scan) option and set the step to .12 gauss if you’re using the resistor and to .25 gauss if you’re not.

(the smallest step taken will still be .25 or .5 Gauss)

EXAMPLE 1:

Goto 100 Gauss to saturate the sample and than back up to about -20 Gauss to do some scans with the smallest stepsize. And make some scans in between at 300 and at ‘exactly’ 0 zero Gauss

Then your table should look something like this:

Goto	Stepsize	1 / E/ N
100	20	1
10	20	N
1	1	N
0	.12	1
-16	5	N
-19	1	N

-20	.12	1
-22	.12	E

Press “See scan results” after the scan is done to quickly see your results and save them
Press “Start results analyzer” to more accurately inspect and edit your results

4. Results Analyzer

Used to manipulate and view surface scanning results.

The main screen is split up in two parts: Top and Bottom. Both with the same functionality of viewing/loading/saving and manipulating surface scanning results. You choose which side (up or down) to manipulate by using the ‘Select Up/Down’ checkbox. You can choose what to display by using the LIA/LIB checkboxes on each side.

Operations you can perform on the scans are:

- Normalize LI's
Performs a global normalization; after this operation the lowest value found in the consecutive LIA/LIB scans will be 0 and the highest will be 1.
- Normalize LI with DCV
Divides all LIA/LIB scans by the associated DV-voltage scans.
- Subtract current scan from LIA/LIB scans
Subtracts the currently viewed scan from all the other scans.
- Delete selected scan
Deletes the currently viewed scan
- Delete all scans on selected side
Deletes all scans on the selected side (up/down)
- Copy current scan to other side
Copy the currently viewed scan (of the selected side) to the currently viewed ‘position’ (no overwriting) on the other side.

The Align Graphs tab-window

This is used to align scan that are shifted with respect to each other on a pixel by pixel basis
Usage:

- Use the cursor to select a common pixel that you want to align to in each successive scan. Every time after setting the cursor press “set alignment point” to store each position.
- Now go to the scan that you want not affected and press “align now” to shift all other scans.

Note: whatever gets shifted out on one side will be shifted back in on the opposite side.