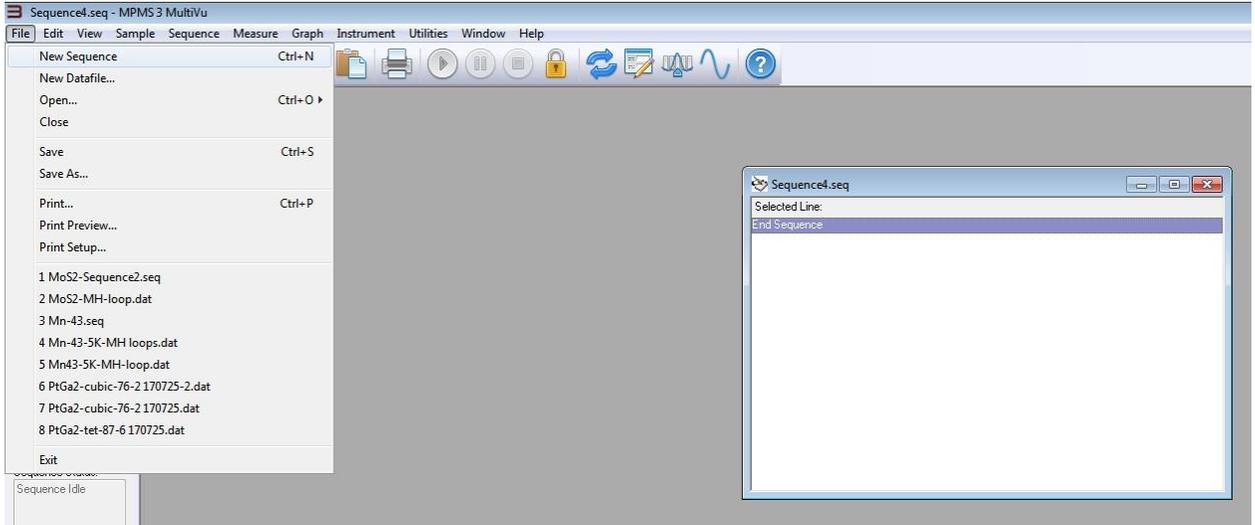


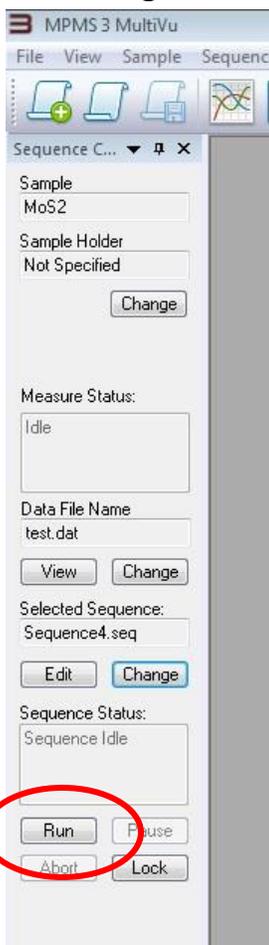
# SQUID Sequence Guide

20170728 lzhu

1. You can choose from Menu bar to create new experiment sequence.



On the right of the software window, you will see the sequence options:



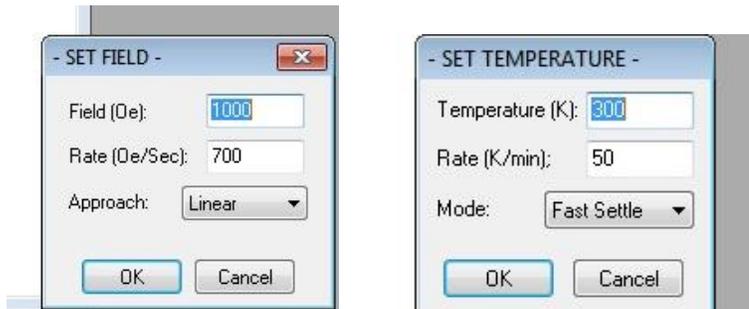
You can double click those commands to add them into your own sequence.  
Make sure you save your sequence.

To start your sequence,  
click "Run" on the left panel of software.

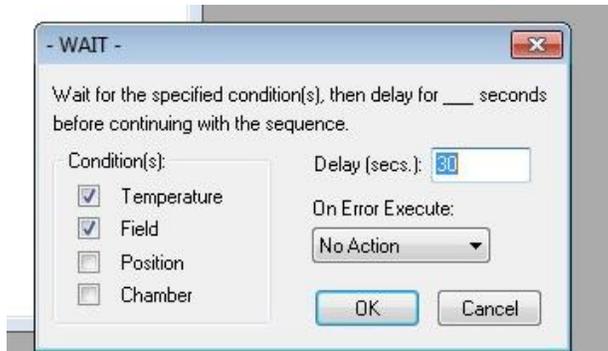
**UP&DOWN Arrow buttons** on sample chamber are both **green flashing** when sequence is running.

- 2.

1) Usually you start with **“Set Temperature”** and **“Set Field”** to initialize your experiment at conditions before collecting data



It is good to have a **“Wait”** command after **“Set Temperature”** and **“Set Field”** to let the condition set equilibrates. 30s is good wait delay.



## 2) Moment VS Field measurement: usually for hysteresis loop

For DC measurement, choose “DC” in tab.

You can choose the start and end fields by clicking and dragging in the “Select Start/End Quadrant” window. The white highlighted area is your measurement loop.  $H_{max}$  is your highest positive magnetic field and  $H_{min}$  is your lowest negative magnetic field. Using the “Set Field” command to get to the “start field” is preferred.

“Stable at each field”: (Slow mode) Do the measurement when the field is stable. “Sweep Rate” can also influence experiment time.

“Sweep Continuously”: (Quick mode) Do the measurement when sweeping the field.

“Data Acquisition”: Choose the spacing mode on field: H, 1/H, logH. If you need more data points in low field, 1/H or logH is preferred.

“Number of Fields”: Number of Data Points from Min to Max

The screenshot shows the MPMS 3 Moment vs Field software interface. The 'DC' tab is selected in the 'Setup' section. The 'Field Sequence' section shows a hysteresis loop diagram with a white highlighted area. The 'Field Control' section has 'Stable at each field' selected. The 'Data Acquisition' section has 'Uniform Spacing in Log(Field)' selected. The 'Number of Fields' is set to 25. The 'Fields' list shows values from -8762.15 to 20000.00. The 'Estimated' section shows 'Time = 00:27 (h:m)' and 'Lines = 61'. The 'Data Logging' checkbox is checked. The 'OK', 'Cancel', and 'Help' buttons are visible at the bottom.

Annotations in red:

- DC tab
- Select Start/End Quadrant
- Field data points

### 3) **Moment VS Temperature** measurement: usually for a **magnetic susceptibility measurement**

For a DC measurement, choose **“DC”** in the tab.

**“Start”**: Start temperature. Using the **“Set Temperature”** command to get to the “start temperature” is preferred.

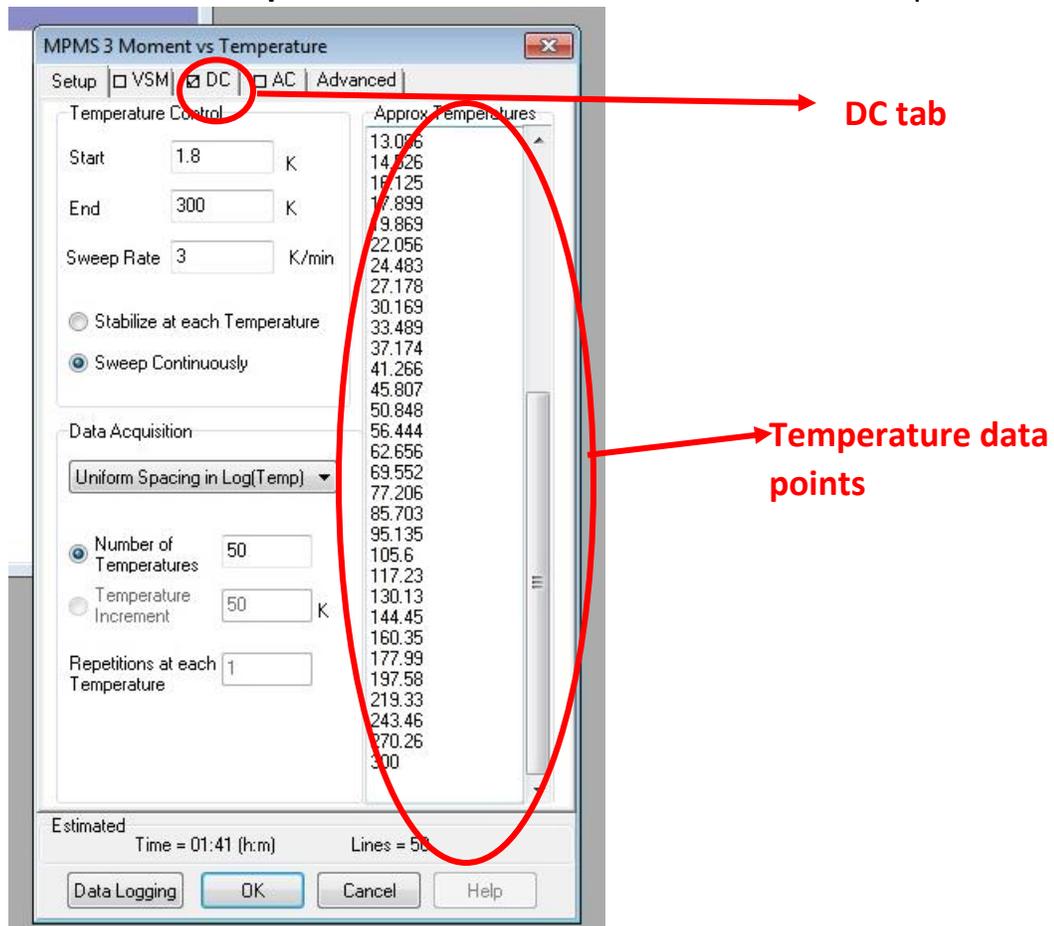
**“End”**: End temperature.

**“Stable at each Temperature”**: (Slow mode) Do the measurement when the temperature is stable. **“Sweep Rate”** can also influence experiment time.

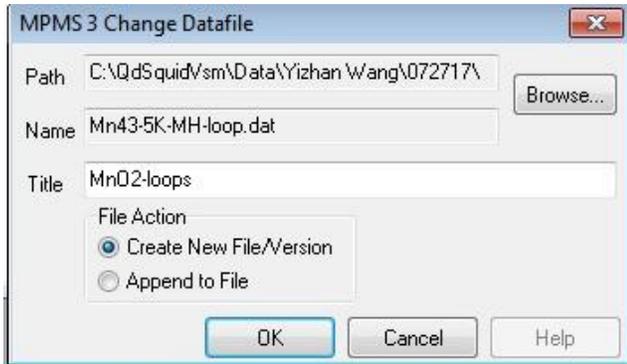
**“Sweep Continuously”**: (Quick mode) Do the measurement when sweeping the temperature.

**“Data Acquisition”**: Choose the spacing mode on temperature: T, 1/T, logT. If you need more data points in low temperature, 1/T or logT is preferred.

**“Number of Temperatures”**: Number of Data Points on temperature



- 4) If you have more than one measurement command in one sequence, it is better to have a **“New Datafile”** command before the measurement command. Those measurements won't overwrite each other.



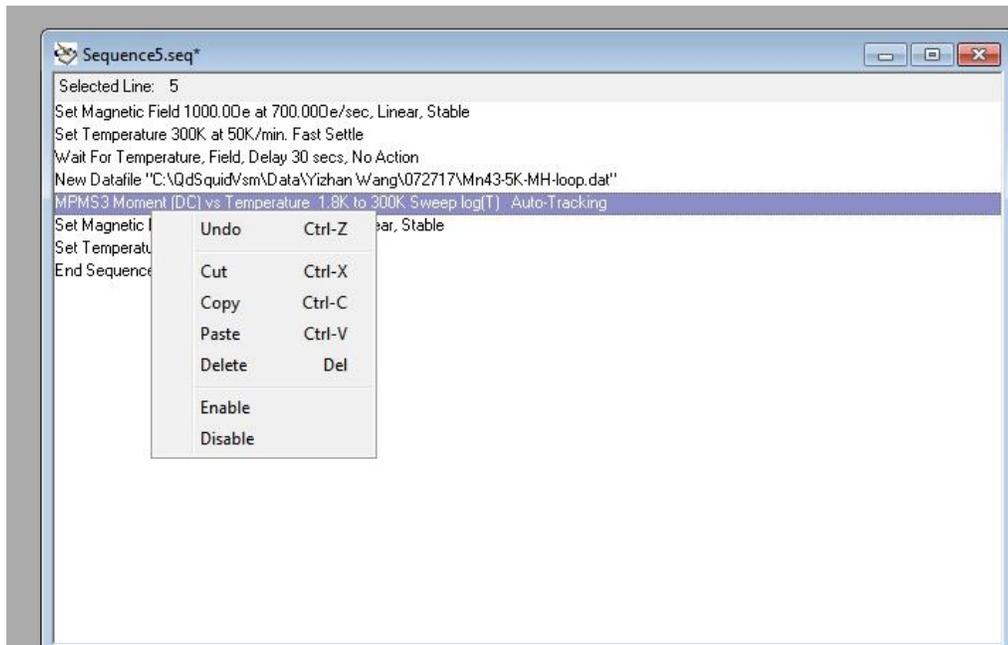
- 5) At the end of your sequence, the following commands are preferred:

**“Set Temperature”: 300K**

**“Set Field”: 0 Oe**

In this way, the spectrometer is always in idle mode when the sequence is finished and ready for removing the sample.

- 6) You can copy, cut, paste, delete each command line in a sequence:



3. Here is an example of a sequence:

The screenshot shows a sequence editor window titled "Sequence5.seq\*" with the following commands:

- Selected Line: 2
- Set Magnetic Field 1000.00e at 700.000e/sec, Linear, Stable
- Set Temperature 10K at 50K/min. Fast Settle
- Wait For Temperature, Field, Delay 30 secs. No Action
- New Datafile "C:\QdSquidVsm\Data\Yizhan Wang\072717\Mn43-5K-1MH-loop.dat"
- MPMS3 Moment (DC) vs Temperature 1.8K to 300K Sweep log(T) Auto-Tracking
- Set Magnetic Field 0.00e at 700.000e/sec, Linear, Stable
- Set Temperature 300K at 50K/min. Fast Settle
- End Sequence

Annotations and their corresponding sequence lines:

- Set temperature and field for measurement start point. Wait 30s** (points to "Set Magnetic Field 1000.00e at 700.000e/sec, Linear, Stable" and "Set Temperature 10K at 50K/min. Fast Settle")
- New datafile before measurement command** (points to "New Datafile 'C:\QdSquidVsm\Data\Yizhan Wang\072717\Mn43-5K-1MH-loop.dat'")
- Measurement command Moment VS Temperature** (points to "MPMS3 Moment (DC) vs Temperature 1.8K to 300K Sweep log(T) Auto-Tracking")
- In the end of the sequence, set temperature and field to normal value(300K and 0 Oe)** (points to "Set Magnetic Field 0.00e at 700.000e/sec, Linear, Stable" and "Set Temperature 300K at 50K/min. Fast Settle")