Instrument scientist or user controlled functions

Commands listed below are typed into instrument computer at the command window or used in a sequence file.

Note: All functions are case sensitive because the current version of python is case sensitive

COMMAND	Instrument	Description
IFOpen HeInterface IFOpen He3nmr	SANS BT-7	opens the ^{3}He interface
IFClose HeInterface IFClose He3nmr	SANS BT-7	closes the ^{3}He interface
IFTalk HeInterface “He3PolEnabled()” IFTalk He3nmr “He3PolEnabled()”	SANS BT-7	checks to see if ^{3}He polarizer is enabled
IFTalk HeInterface “He3AnaEnabled()” IFTalk He3nmr “He3AnaEnabled()”	SANS BT-7	checks to see if ^{3}He analyzer is enabled
IFTalk He3nmr “He3PolFlipOff()”	BT-7	turns off the ^{3}He flipper for the polarizer
IFTalk He3nmr “He3PolFlipOn()”	BT-7	turns on the ^{3}He flipper for the polarizer
IFTalk HeInterface “He3AnaFlipOff()” IFTalk He3nmr “He3AnaFlipOff()”	SANS BT-7	turns off the ^{3}He flipper for the analyzer
IFTalk HeInterface “He3AnaFlipOn()” IFTalk He3nmr “He3AnaFlipOn()”	SANS BT-7	turn on the ^{3}He flipper for the analyzers
IFTalk HeInterface “He3PolGetState()” IFTalk He3nmr “He3PolGetState()”	SANS BT-7	returns the current spin state of the ^{3}He polarizer, Up (0) or Down (1)
IFTalk HeInterface “He3AnaGetState()” IFTalk He3nmr “He3AnaGetState()”	SANS BT-7	returns the current spin state of the ^{3}He analyzer, Up (0) or Down (1)
IFTalk HeInterface “He3PolGetNumFlips()” IFTalk He3nmr “He3PolGetNumFlips()”	SANS BT-7	returns the total number of flips for the polarizer
IFTalk HeInterface “He3AnaGetNumFlips()” IFTalk He3nmr “He3AnaGetNumFlips()”	SANS BT-7	returns the total number of flips for the analyzer
IFTalk He3nmr “PolarizerFID()”	BT-7	perform an NMR measurement for polarizer
IFTalk HeInterface “AnalyzerFID()” IFTalk He3nmr “AnalyzerFID()”	SANS BT-7	perform an NMR measurement for analyzer
IFTalk HeInterface “FIDSetField(value)” IFTalk He3nmr “FIDSetField(value)”	SANS BT-7	sets the field (current in amps) of the solenoid for the analyzer, value is a real number ranged from 1.5 to 5.2. **For 3He staff only**

During the experiment, only the 3He team is allowed to operate the 3He computer. Please contact the 3He team if there is any issue with the instrument-controlled 3He spin flipping, FID NMR measurement or any 3He NMR functions.

A list of the IGOR NMR functions with more detailed explanation

He3PolEnabled()

The function returns “1 = 3He polarizer Enabled?” if the 3He team did 3He initialization, otherwise returns “0 = 3He polarizer Enabled?”. It is a dummy function in order to match the BT-7 instrument software. It is not necessary for SANS, reflectometer.

He3AnaEnabled()

The function returns “1 = 3He analyzer Enabled?” if the 3He team did 3He initialization, otherwise returns “0 = 3He analyzer Enabled?”. It is a dummy function in order to match the BT-7 instrument software. It is not necessary for SANS, reflectometer.

He3PolFlipOff()

The function forces the 3He spin to “Up” no matter what the current 3He spin state is for the polarizer. It returns “0 = 3He polarizer state”. It does nothing to the ^{3}He spin if it is “Up” or 0. Otherwise, the ^{3}He spin will be flipped once. After flipping ^{3}He spin, it will automatically toggle back to the NMR configuration for the user experiment.

He3PolFlipOn()

The function forces the 3He spin to “Down” no matter what the current 3He spin state is for the polarizer. It returns “1 = 3He polarizer state”. It does nothing to the ^{3}He spin if it is “Down” or 1. Otherwise, the ^{3}He spin will be flipped once. After flipping ^{3}He spin, it will automatically toggle back to the NMR configuration for the user experiment.

He3AnaFlipOff()

The function forces the 3He spin to “Up” no matter what the current 3He spin state is for the analyzer. It returns “0 = 3He polarizer state”. It does nothing to the ^{3}He spin if it is “Up” or 0. Otherwise, the ^{3}He spin will be flipped once. The function also automatically tune the solenoid current to the right value adequate for the AFP flipping (very important), then after flipping, the current is automatically tuned back for the user experiment.

He3AnaFlipOn()

The function forces the 3He spin to “Down” no matter what the current 3He spin state is for the analyzer. It returns “1 = 3He polarizer state”. It does nothing to the ^{3}He spin if it is “Down” or 1. Otherwise, the ^{3}He spin will be flipped once. The function also automatically tune the solenoid current to the right value adequate for the AFP flipping (very important), then after flipping, the current is automatically tuned back for the user experiment.

He3PolGetState()

The function returns “0 = 3He polarizer state” or “1 = 3He polarizer state”

He3AnaGetState()

The function returns “0 = 3He analyzer state” or “1 = 3He analyzer state”

He3PolGetNumFlips()

The function returns “# = actual number of flips for polarizer”.

He3AnaGetNumFlips()

The function returns “# = actual number of flips for analyzer”.

PolarizerFID()

The function does a FID NMR measurement for polarizer and returns a number of fit parameters.

AnalyzerFID()

The function does a FID NMR measurement for analyzer and returns a number of fit parameters. The function also automatically tune the solenoid current to the right value adequate for the FID NMR measurement, then after the measurement, the current is automatically tuned back for the user experiment.

FIDSetField(value)

The function sets the solenoid current for either the FID NMR measurements plus AFP flipping or the user experiment. The value is a number for the solenoid current and is ranged from 1.5 to 5.2 amps. But there is both a software and hardware limit protection. We do not suggest using it if not necessary. Call us before using this command.