

# Instructions for Loading McStas Simulation

- Use the latest version of VirtualBox to launch the Ubuntu 16.04 virtual machine provided.
- The username and password are both `vagrant`.
- Launch a terminal window (CTRL/CMD+ALT+T)
- Launch McStas GUI Controls `mcgui &`
- In the MCGUI go to `File->Open instrument` and select  
`/home/vagrant/Desktop/LOKI/loki_master-model.instr`
- To view the contents of the instrument file select `Edit/New`.
- To run the simulation "as-is", just hit `Run` which launched the run dialog.
- Click `Start` and the simulation will commence.
- When the simulation is complete hit `Plot` to see the results.
- In order to close the graph window, users must press `Q` on the keyboard.

## Tracing

- Click `Run` in the mcgui and change the `Simulation` option to `Trace` and then click `Start`.
- A 2D instrument view (X-Z) will be displayed.
- To zoom into the instrument hit `Z` on the keyboard and use the mouse to select a region of interest.
- Right-clicking resets to the previous zoom.
- Hit the space bar to trace individual neutron packets.

**N.B** The version of the `loki-master-model.instr` being used was developed by Andrew Jackson of the ESS. There have been a few minor modifications for outputting additional TOF and wavelength information. The ESS have a [bitbucket repository](#) with regular revisions to the loki instrument. These files represent a snapshot in this development with a few minor changes.

## Modifying the instrument file

### Components

A list of all components and their descriptions can be found [here](#). You can also download and view the source-code for each component.

### Source

The source currently being used in the loki instrument file is the ESS butterfly moderator (Line 283). To switch between this moderator and the basic ESS moderator, comment `//` Lines 283-287 and remove the comments from Lines 289-296. The parameters for these moderators can be found [here](#):

- [ESS\\_butterfly](#)
- [ESS\\_moderator](#)

## Sample

The sample (Line 670 of the instrument file), is an isotropic water sample. The full details of this type of component can be found [here](#).

## Monitors

Lines 732-750 of the instrument file contains three simple 2x2m detectors which measure intensity, time-of-flight and wavelength respectively. The positions of these detectors are set to be ~1m along the beamline with respect to the sample using the mcstas `AT (x, y, z) RELATIVE SAMPLE` formalism, where  $z$  is along the beam direction. One can easily modify this position by changing the  $z$  value. The TOF detector is currently set to detect time of flight values between 0 - 0.1seconds ( $t_{min}$  and  $t_{max}$ ). The Lambda detector is set to detect wavelengths between  $l_{min\_source}$  and  $l_{max\_source}$  which are calculated based on the instrument parameters  $l_{min}=3.0\text{\AA}$  and  $l_{max}=9.7\text{\AA}$ .

## MCSTAS Team

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