1. Introduction

MESA (Modules for Experiments in Stellar Astrophysics) is a suite of libraries for a wide range of applications in computational stellar astrophysics. It contains a 1D stellar evolution module, MESA Star, which combines many of the numerical and physical modules for simulations of a wide range of stellar evolution scenarios ranging from very low-mass stars to massive stars, including advanced evolutionary phases. MESA Star solves the fully coupled structure and composition equations simultaneously. More information on MESA and MESA Star can be found at http://mesa.sourceforge.net/.

2. Setting up MESA Star

In order to avoid the time-consuming installation of MESA on an individual basis, you will make use of a single source code directory on the strw network. We suggest you ssh into your home account: ssh -X -Y NAME@COMPUTERNAME.strw.leidenuniv.nl. If you are unfamiliar with accessing your strw account remotely, see the remote access primer document (https://helpdesk.strw.leidenuniv.nl/wiki/doku.php?id=remote_access). The location of the code is indicated by setting the environment variables MESASDK_ROOT and MESA_DIR. To set these variables, open the file ~/.cshrc;

gedit ~/.cshrc &

(If the above line doesn't work try '*nano ~/.cshrc*')

Then, add at the end the lines

setenv MESASDK_ROOT /disks/web1/users/nielsen/mesasdk

setenv MESA_DIR /disks/web1/users/nielsen/mesa-r7624

and save the file.

Finally, update the environment variables.

source ~/.cshrc

You should now be able to use MESA. The $MESA_DIR/star/work folder contains an example to check that the Mesa Star module runs. Create a working directory and make a copy of this folder. The working directory must be located in one of the data disks on your office computer, such as /net/computer_name/data1, or on a public data disk (in /disks). It should not be created in /home/username.

mkdir /your_location/your_working_directory

cd /your_location/your_working_directory/

cp -rf $MESA_DIR/star/work .

(Make sure to include the . on the line above)

Then, enter the work directory and compile the code.

cd work
source $MESASDK_ROOT/bin/mesasdk_init.csh

./mk

To recompile the code, you need to repeat the last two lines. Finally, run the code.

./rn

It should run for a few minutes while displaying various pieces of information on the evolution of the star.

Let Alessia (rota@strw.leidenuniv.nl) or Yuan (ychen@strw.leidenuniv.nl) know if there are any issues or confusion.