

Installing the COMPMAG model for XSPEC

This cookbook describes the procedure to install the COMPMAG model, whose details are reported in R. Farinelli, C. Ceccobello, P. Romano, L. Titarchuck, *Numerical solution of the radiative transfer equation: X-ray spectral formation from cylindrical accretion onto a magnetized neutron star*, 2012, A&A, 538, A67. In order to run COMPMAG, it is required:

- The source code of XSPEC v.12 or higher
- The model source code and description files

1 Compiling and installing COMPMAG

To compile COMPMAG, you must first choose the directory in which you want to put the source code of the model (xscompmag.c) and the model description file (model.dat). Let us call this directory, e.g., `/home/username/compmag`. **IMPORTANT:** you must have write permissions to the directory, as the local model library file libcompmag.so and some additional object files will be produced there.

Thus first cd to `/home/username/compmag`. To compile the model:

- Run XSPEC from shell
- From XSPEC prompt type:

```
XSPEC12> initpackage compmag model.dat /home/username/compmag
XSPEC12> lmod compmag /home/username/compmag
```

Alternatively, you can put the above two command lines in a file, e.g., `init.xcm` and then, from the XSPEC prompt type:

```
XSPEC12> @/home/username/compmag/init.xcm
```

If the compilation works successfully, you should find the shared library file **libcompmag.so** in the directory `/home/username/compmag`.

Remember, however, that even if the compilation of the model worked successfully, you have to reload the model library every time you run XSPEC. In order to avoid that, go into `$HOME/.xspec` directory, which is automatically created for each user at first XSPEC running, edit (or newly do if it does not exist) the file `xspec.rc`, and add the line `lmod compmag /home/username/compmag`.

It is also worth pointing out that when you run XSPEC in batch mode, reading of the \$HOME/.xspec/xspec.rc file is skipped. Thus if for example you want to load some spectra and the best-fit model (with COMPMAG) you cannot just give the command

```
> xspec - data.xcm model.xcm
```

but rather the following command

```
> xspec - load_compmag.xcm data.xcm model.xcm
```

where the file load_compmag.xcm, as xspec.rc, contains the line
lmod compmag /home/username/compmag.

For any problem and suggestions, please contact

Ruben Farinelli
email: farinelli@fe.infn.it