

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 (`xscopymag.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 COMP MAG) you cannot just give the command

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

but rather the following command

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

where the file load_compomag.xcm, as xspec.rc, contains the line
lmod compomag /home/username/compomag.

For any problem and suggestions, please contact

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