RMFIT Version 4.3.2

December 3, 2015

Contents

1   System Requirements

- Mac OS X 10.6 Snow Leopard or newer (for 10.10 Yosemite and 10.11 El Capitan see Installation Issues) **OR** a Linux derivative

- Bourne shell (bash)

- X11

- gfortran (if using Linux)

2   Included in the Install Package

- IDL 8.1 virtual machine

- RMFIT 4.3.2 IDL executable

- gfortran and GSL libraries

Note: At this time, for Linux OS, you will need to install the gfortran package via your Linux vendor if it is not already installed.

3   Installation

3.1   Mac OS X

1. Download the *rmfit_v432.pkg* to any directory on your computer

2. Double click the package installer instructions.

3. Follow the package instructions. If you do not have admin privileges then you will have to select the **Change Install Location** when you come to the installation type and select **Install for me only**. RMFIT will then be installed under your username in the **Applications** directory. Otherwise, choose the standard install.

Note: You can create an alias by typing the following into your .bashrc (or equivalent shell script file): **alias rmfit='<rmfit_v432_dir>/rmfit_v432.command'** where **<rmfit_v432_dir>** is the directory where you installed RMFit.

3.2   Linux

1. You will need to install the gfortran package via your Linux vendor if not already installed.

2. Download *rmfit_v432.tar.gz* to any directory on your computer where you want RMFIT installed.

3. Decompress the file: At the command prompt enter **gunzip rmfit_v432.tar.gz**

4. Extract the tar file: At the command prompt enter **tar -xf rmfit_v432.tar**

Note: RMFIT will be installed in the directory where you decompressed and extracted the tar file. You can create an alias by typing the following into your .bashrc (or equivalent shell script file): **alias rmfit='<rmfit_v432_dir>/rmfit_v432'** where **<rmfit_v432_dir>** is the directory where you installed RMFit.

3.3   Alternatives

- If the user has a different shell other than bash, copy the contents of the newly created *.bashrc* into your corresponding interactive shell script and modify the commands accordingly.

- In some cases the the user's *.bash_profile* script may be executed instead of *.bashrc* when running an interactive shell. In this case, select the contents of the *.bashrc* that were added by installing RMFIT, and copy them to the *.bash_profile*.

4   Launching RMFIT

4.1   Mac OS X

To launch RMFIT, do one of the following:

- Double click the *rmfit_v432.command* file in the **Applications** directory

- Type **/<rmfit_v432_dir>/rmfit_v432.command** at any terminal prompt, where **<rmfit_v432_dir>** is the directory where you installed RMFit.

- Using a command prompt, **cd** to the RMFit installation directory and type **./rmfit_v432.command**

4.2   Linux

To launch RMFIT, do one of the following

- Double click the *rmfit_v432* file in the RMFIT installation directory.

- Type **<rmfit_v432_dir>/rmfit_v43** at any terminal prompt, where **<rmfit_v432_dir>** is the path to rmfit_v432.

- Using a command prompt, **cd** to the RMFIT installation directory and type **./rmfit_v432**

5 Uninstallation

Delete the rmfit installation directory.

6 Features

- GRB Lightcurve tools for background-fitting, lightcurve binning, and source selection

- Over 40 spectral models with capabilities for user-specified spectral models

- Spectroscopy model fitting

- A choice of three different figures of merit for use in spectral model fitting

- Tools to display the best fit photon and νF_ν spectrum

- Batch spectral fitting mode for time-resolved spectral fitting

- Tools for plotting parameter distributions from spectral fitting, as well as the ability to export the fit results in ASCII or FITS format (SCAT files)

- The ability to generate synthetic data by folding a spectral model through GBM detector response matrices and producing simulated spectra and background data.

- The ability to fit synthetic data produced by RMFIT and produce parameter and statistic distributions for the purpose of simulation and hypothesis testing.

7 Known Issues

7.1 Installation Issues

Running RMFIT on Mac OS X 10.10 Yosemite, the user may encounter an error related to the libz dynamic library:

1. From the RMFIT directory: **cd <rmfit_v432_dir >/idl81/bin/bin.darwin.x86_64/**

2. Remove the out-of-date library mentioned in the error message: **rm libz.1.dylib**

3. Replace it with the link to the OS provided library: **ln -s /usr/lib/libz.1.dylib libz.1.dylib**

In Mac OS X 10.11 El Capitan, there have been a set of changes designed to eliminate the root account called, 'System Integrity Protection'. As a part of this suite, certain dynamic linker (dyld) environment variables, such as DYLD_LIBRARY_PATH, are purged when launching protected processes. For RMFIT, this means that some linked libraries can not be found when attempting to perform spectral fitting, since they are expected to be referenced through

DYLD_LIBRARY_PATH from mfit.so. One of these libraries is the Gnu Science Library libgsl.0.dylib, found in **./rmfit432/idl81/lib**. You can fix this issue by creating a symlink in **/usr/local/lib** for any affected library. Note that you can no longer modify the contents of **/usr/lib** in El Capitan.

7.2 Data File Issues

- Users should not have any spaces in the directory/folder or file names as the IDL GUIs will read them as new line characters.

- The user is not warned about overwriting image files.

- If a joint spectral fit is performed with LAT or *Swift* data files and a non-GBM data file is loaded first, the creation of an SCAT file will not prompt for the user input of the filename.

- The RMFIT-generated background-subtracted XSPEC-compatible files are not compatible with RMFIT. The spectrum from these files will not be fit.

- If lightcurve data is exported to an ASCII or IDL save file, the data is exported at the native time and energy resolution, irrespective of the current resolution.

- If a LAT data file is imported, the user cannot import the file from the lookup file name. The data file itself must imported and then the lookup file must be imported.

- If, when loading in an SCAT or BCAT file into RMFIT, the user wishes to dump the file information to the fit log, a detector must be loaded into RMFIT or else an error will be issued.

7.3 Miscellaneous Issues

- If RMFit will not run on your Mac and you have satisfied all of the system requirements, check your version of XQuartz. Version 2.7.2 has a known issue with IDL, as updating to the most recent version should fix the problem.

- If CSPEC files are imported to be used as background for the TTE, deleting the CSPEC files causes the background models to be deleted.

- Due to differences in the model-fitting process between RMFIT and XSPEC, the spectral fit parameters are not guaranteed to match when comparisons are made between RMFIT and XSPEC.

- The 'Zoom Out: Full Range' option does not work when the display is focused on the counts spectrum.

- When batch fitting, if multiple detectors are loaded in to RMFIT, they will all be used in fitting. If the user wishes to not include a detector in the batch fit, the user must delete the detector from RMFIT.

8   Acknowledgments & Contact Details

This software package was created by the *Fermi*/GBM Science Team. These release notes were compiled by Adam Goldstein and Anne Diekmann

Send any installation problems, questions, or bug reports not included in the **Known Issues** section to fermihelp@milkyway.gsfc.nasa.gov.