Improved GBM GRB localizations with BALROG

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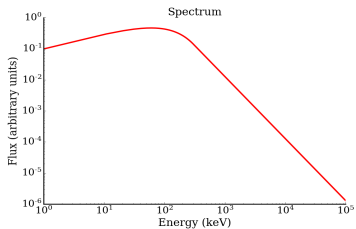Heidelberg, 21st March 2019
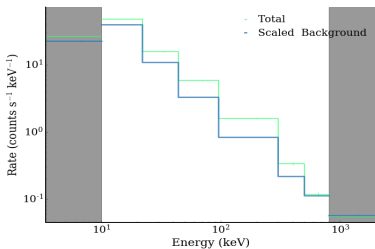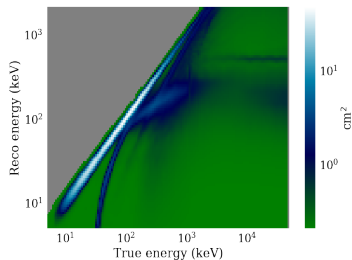
PyGamma 19

What is BALROG?

- ▶ BALROG (Bayesian Location Reconstruction of GRBs) is an advanced localization algorithm for Fermi-GBM implemented in the 3ML framework.

- ▶ The code fits simultaneously for both source spectrum and location and generates a full posterior distribution of the parameters.

Forward folding

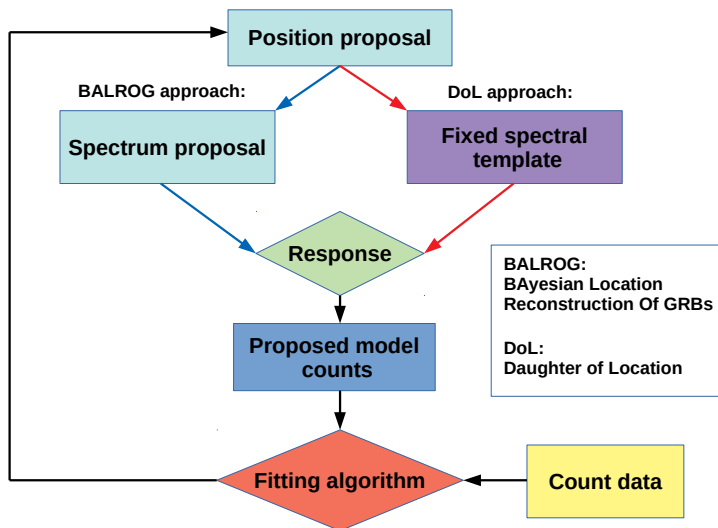
Position proposal

Spectrum
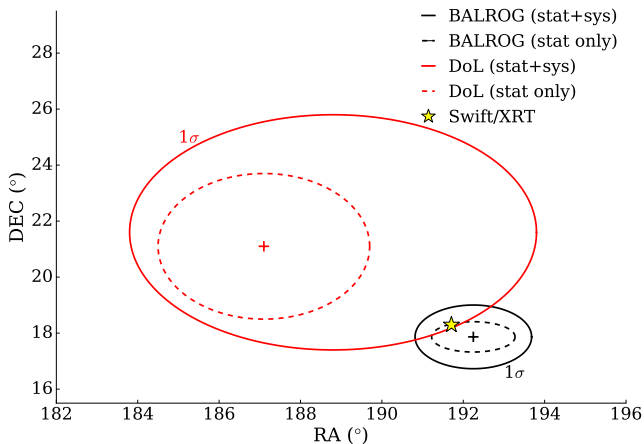
The spectrum is convolved through the response

We fit by varying the spectral parameters, trying to match the measured counts

DoL and BALROG algorithms

Why use BALROG?

To correct for the inherent inaccuracy of DoL's localizations, the
statistical error is convoluted with a systematic contribution.

Summary

- ▶ BALROG substantially improves the GBM's localization performance and is able to remove almost all of what were previously thought as instrument systematics.

- ▶ The code is currently being used to provide rapid GRB localizations, available to the community at https://grb.mpe.mpg.de/.

- ▶ **BALROG is open source**: you can find the code in our github repository https://github.com/mpe-grb.