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High Energy Astrophysics
Science Archive Research Center

XSPEC update

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Status

The current release is 12.3.1 and patch level is 12.3.1am. Our policy is to distribute the latest patched version with each HEAsoft update and produce a new xspec release every 6-8 months.

We also continue to release and support v11.3.2. Our policy on v11 is we will continue to fix critical bugs but will not add new features. New models are only added to v12.

The standard XSPEC reference (Arnaud 1996) now has more than 1000 citations in ADS.

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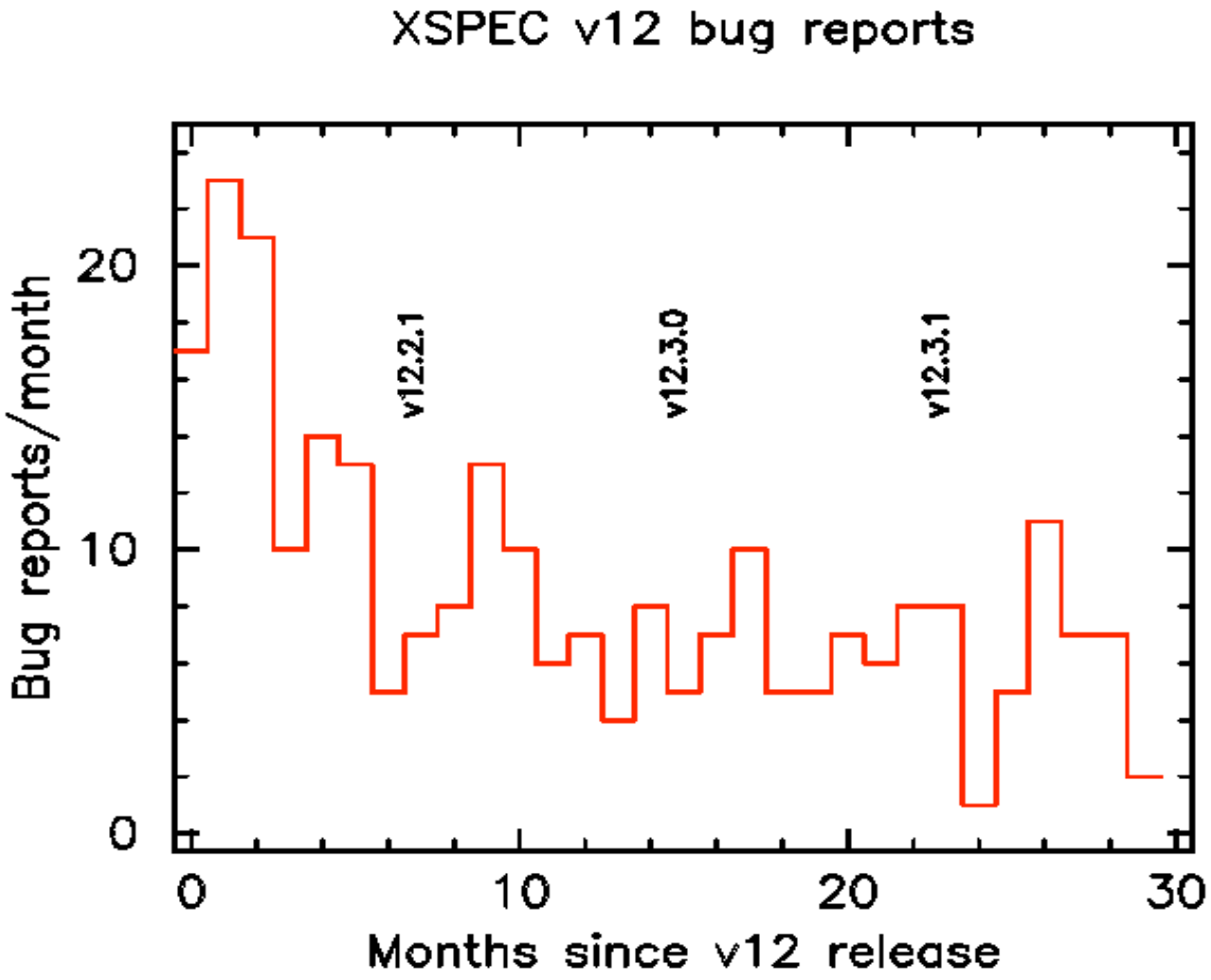

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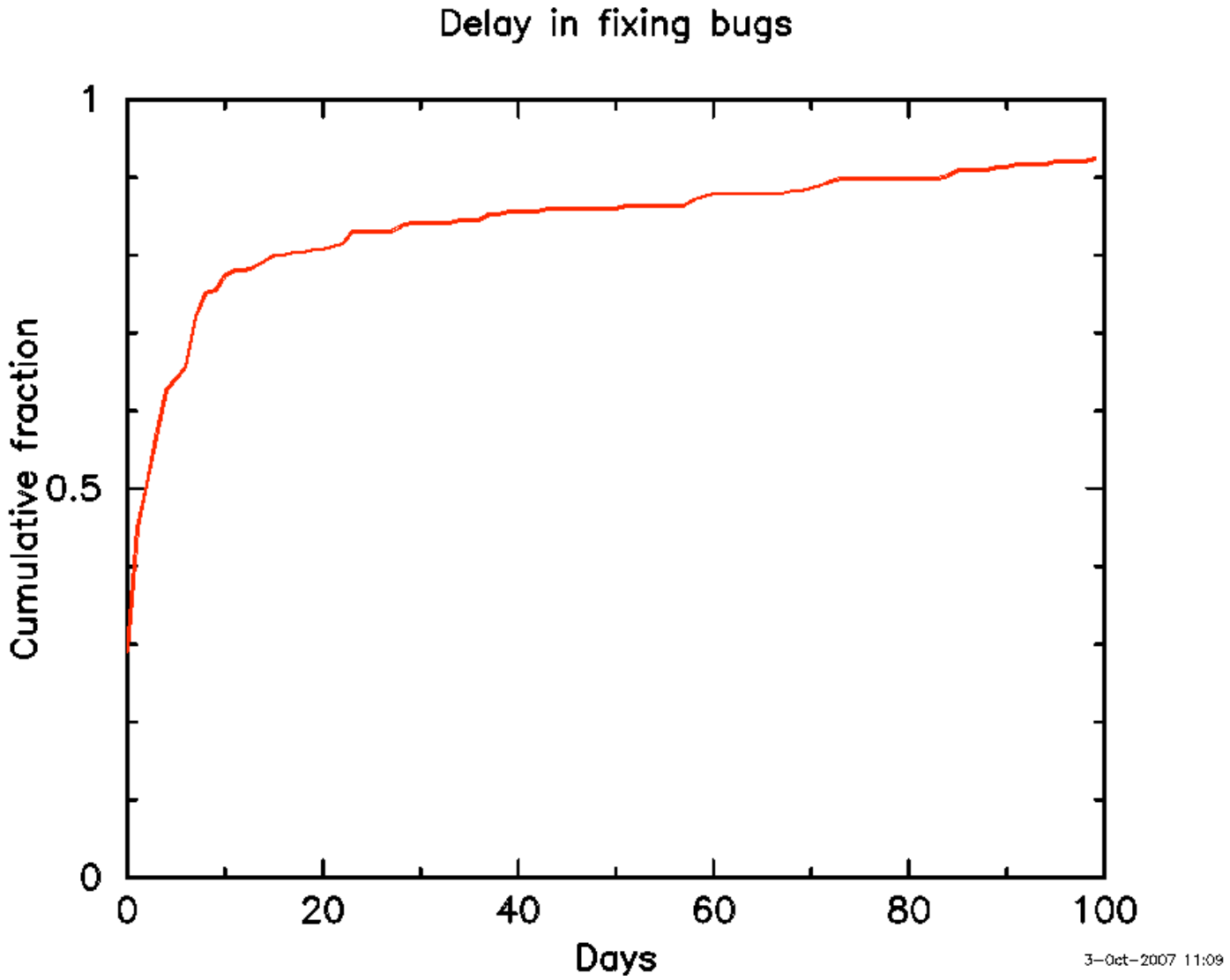

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Coming in v12.4

Much improved Markov Chain Monte Carlo capabilities. MCMC is the preferred method in the computational statistics literature for complex models with many parameters.

Added flexibility in defining proposal distributions - a critical step in making the method efficient. Added tempering (a bit like simulated annealing).

MCMC is integrated into other xspec commands. If chains are loaded then these are used to generate confidence regions on parameters, fluxes and luminosities. This is more accurate than the current method to estimate errors on fluxes and luminosities.

Chains can be output either as ascii or FITS files.

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Other things coming in v12.4

A rewrite of the manual. Chapter 4 “Walks through xspec” is about 2 decades out-of-date. The release will have new, more relevant, examples. Chapter 6 “XSPEC V12 Models” will have better cross-referencing to make it easier to find the appropriate model for a problem.

The most popular FAQ is how to estimate error on the unabsorbed flux or the flux of a single component of the model. A general solution is difficult but we have a Tcl script which solves the easier cases and can be used as a template for complicated cases.

Support of GLAST file types.

xset delta <fraction> sets delta for numerical derivatives to the specified fraction of the current parameter value.

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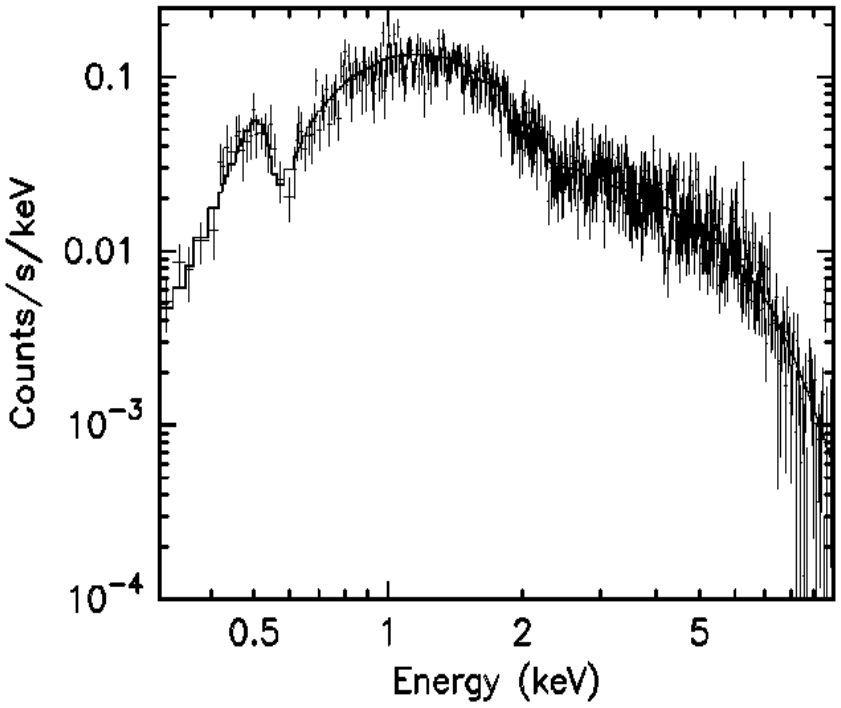
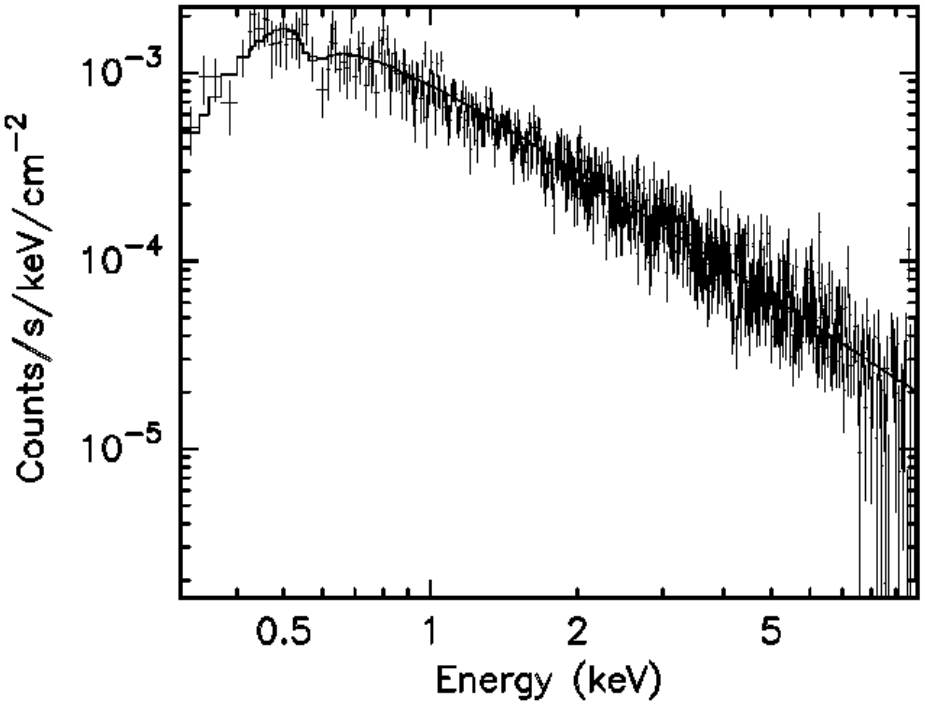
A handy tip : setplot area

Not many people seem to be aware of the setplot area command. This modifies data plots by dividing by a flat spectrum multiplied by the response.





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Web 2.0 ?

I have been keeping a blog (xspector.blogspot.com) since December 2004. This is mainly for my own use but I do note xspec issues and fixes. As with all Google blogs an RSS feed is available.

I would like to find ways of involving the xspec community more.

One possibility would be to wikify the manual and allow it to be edited by any xspec user.

What other ideas are there ? google groups...

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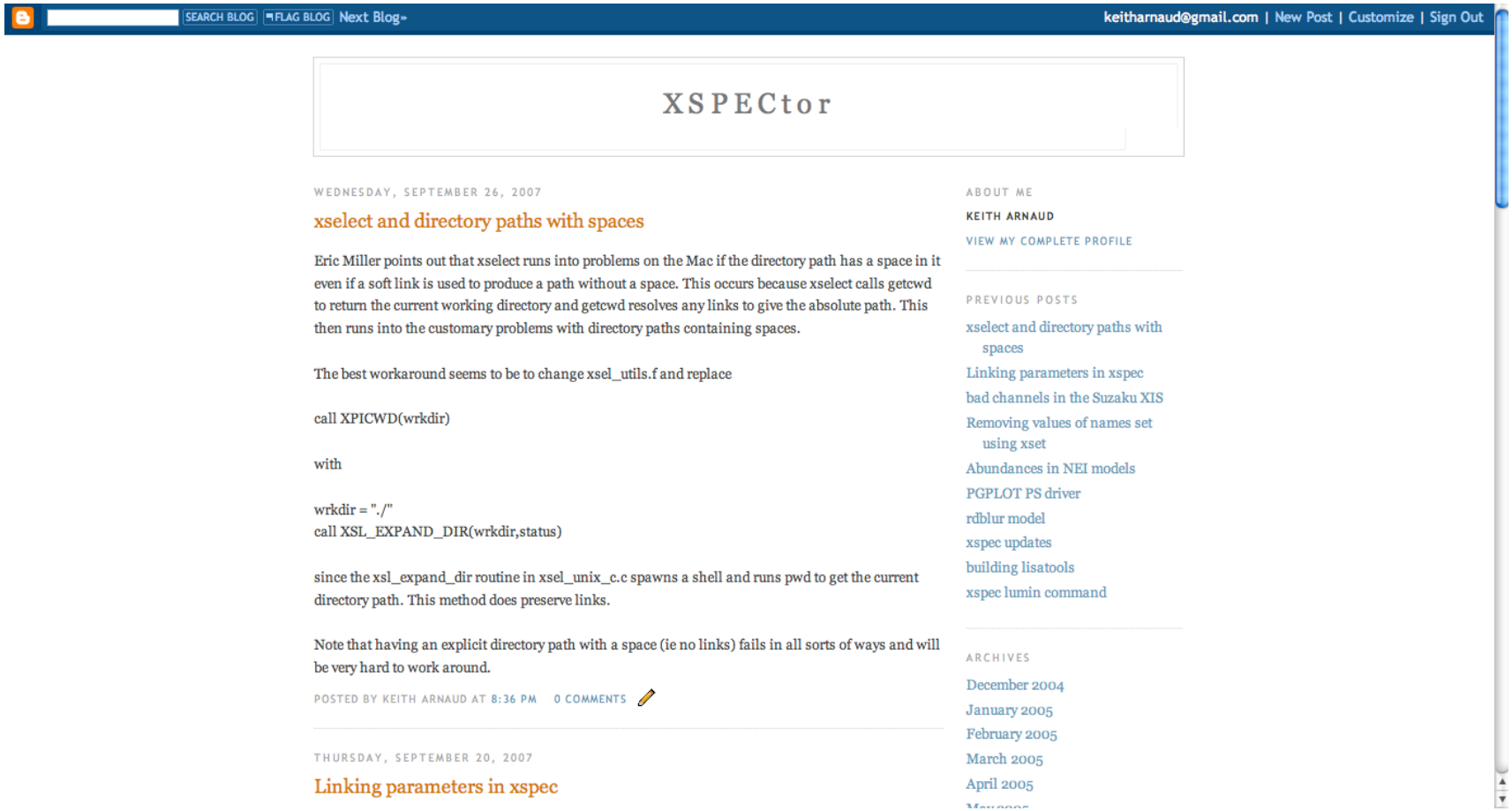
XSPECtor blog



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Future directions

improved scripting options (Python/S-lang)

better multi-wavelength support (note that some groups analyzing Spitzer spectra are starting to do global fitting)

improvements in handling spectra with small number of counts (there is a formally correct way to do this but it is tedious and most people would prefer a faster method)

optimizing use of multi-core machines

more Bayesian options

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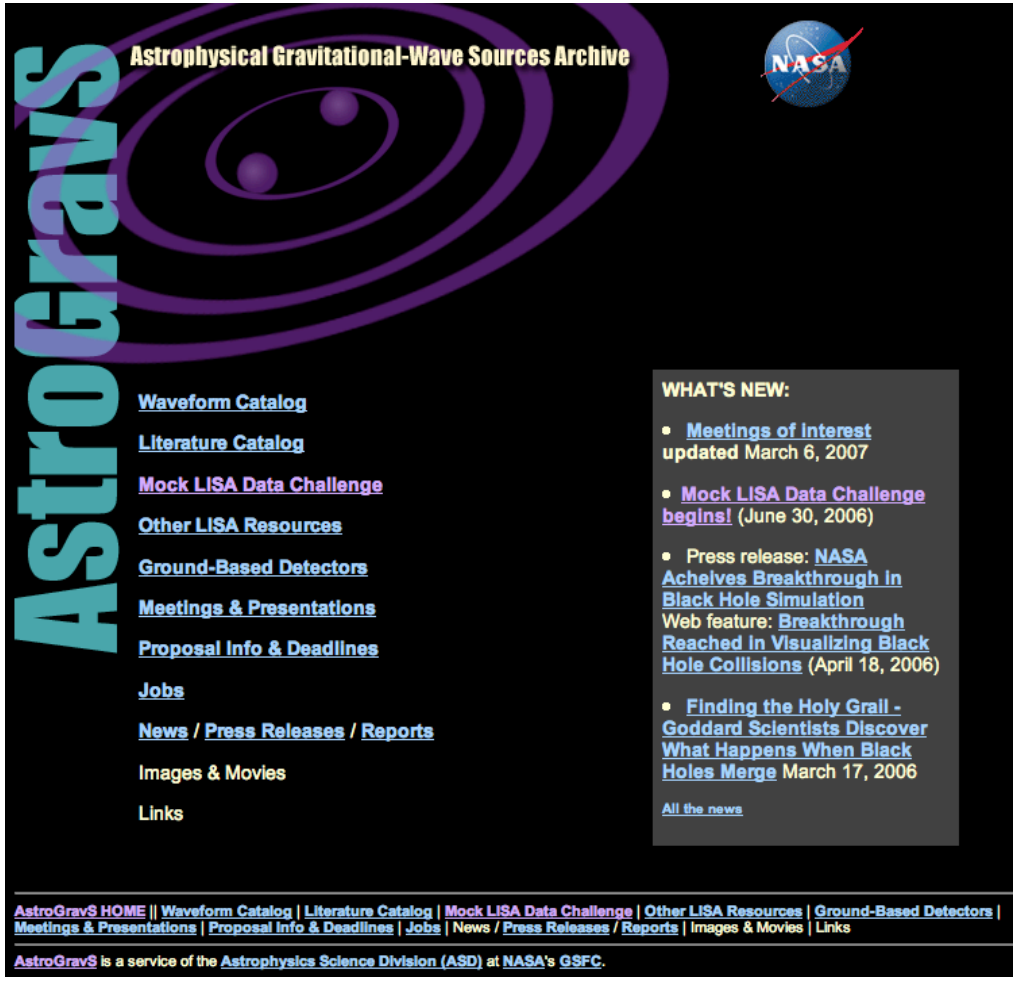
Astrogravs



A prototype gravitational wave astronomy archive.

The important things to archive for GW astronomy are the models. The actual LISA data will fit on your cellphone.

Data analysis will consist largely of searching the data for matches with templates.

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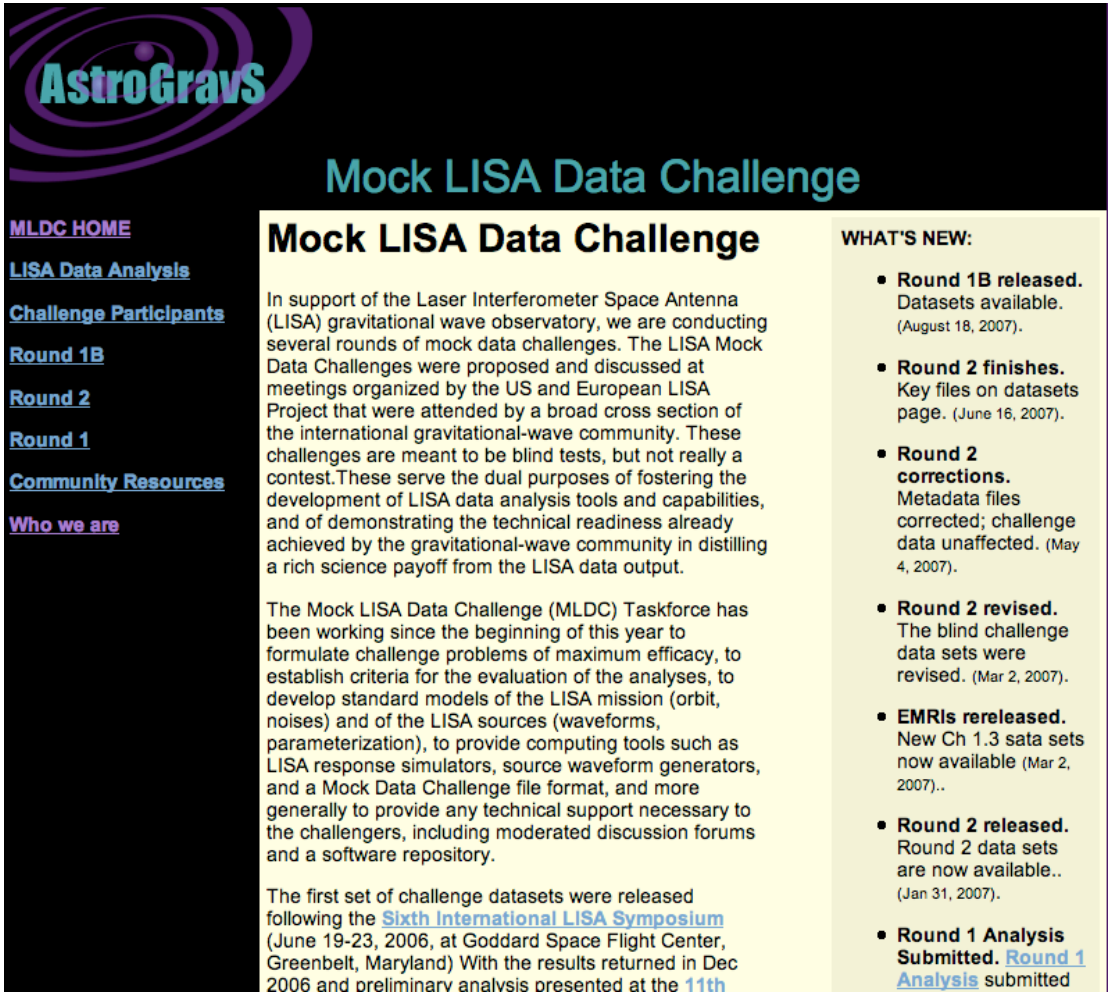
The Mock LISA Data Challenge



To encourage development of LISA data analysis methods and help identify key hardware requirements.

Simulated datasets are hosted on the HEASARC servers.

The challenge consists of a sequence of increasingly complex tasks. We started with datasets containing only one source and have worked up to models of the entire galaxy plus SMBH-SMBH mergers and EMRIs.

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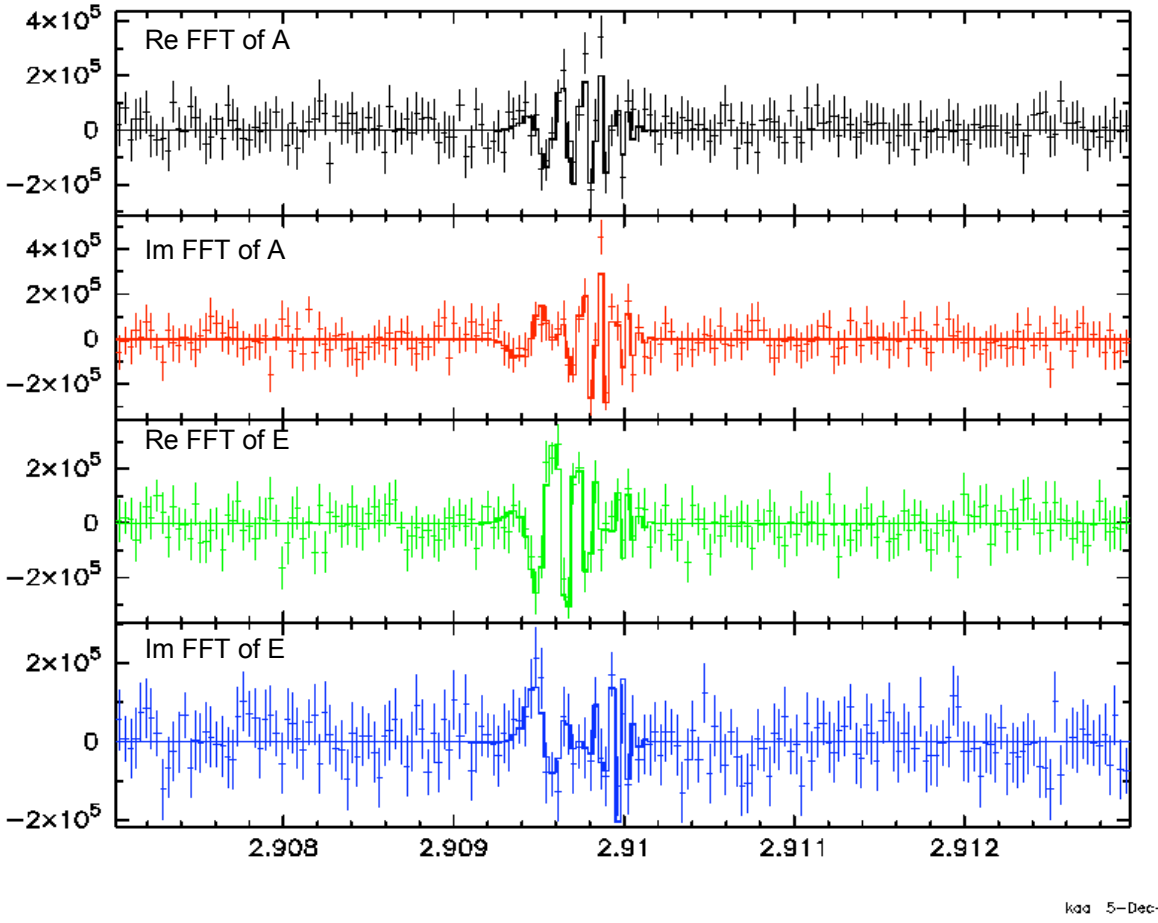
XSPEC: Beyond e-m chauvinism



Simulated LISA observation of a single Galactic binary with constant frequency in source frame. From the Mock LISA Data Challenge.