
PRODUCING REDUCED DATA SETS IN LDAS.

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- Issues in producing reduced data sets (RDS) with **getFrame-Data** user command:
 - Efficiency of Tcl-language implementation.
 - Time delay introduced by downsampling.
 - Start-up transient when downsampling.
 - Issues with linear filtering:
 - IIR filtering of single-precision data not very accurate when acting highly-coloured data.
 - Slow-down of linear filtering (and hence downsampling) on Sun architecture when data values $\leq 10^{-24}$.

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- LDAS-0.4.0 introduces new user command **createRDS**:
 - Entirely C++ implementation for efficiency (Masha Barnes).
Data reduced at $2.5\times$ real time at LHO, using 106 channels, with 41 fast channels downsampled by 1/2.
 - Downsampling factors of 1 (default), 2, 4, 8 or 16 can be specified for each channel.
 - Downsampled data is time-shifted to correct time-delay.
 - Extra data is read in before time requested by user to eliminate start-up transient.
 - Output frames are in 1–1 correspondence with input frames.
*Note: unmodified channels written as FrAdc structures.
Downsampled channels are written as FrProc structures.*
 - Output directory can be specified.

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- Changes to linear filtering and resampling implementation:
 - Filter still preserves precision of input data (single or double), but all intermediate calculations are done at double-precision.
 - IIR filtering of single-precision data now as accurate as filtering double-precision data.
 - No slow-down if data $\leq 10^{-24}$.

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- Usage of **createRDS**:

createRDS

-times { *time-range* }
-ifo { *interferometer-id* }
-type { *frame-file-type* }
-channels { *channel*[!*downsample-factor*] ... }
-usejobdirs { *0-or-1* } (optional)
-outputdir { *dir* } (optional)

For a detailed description see

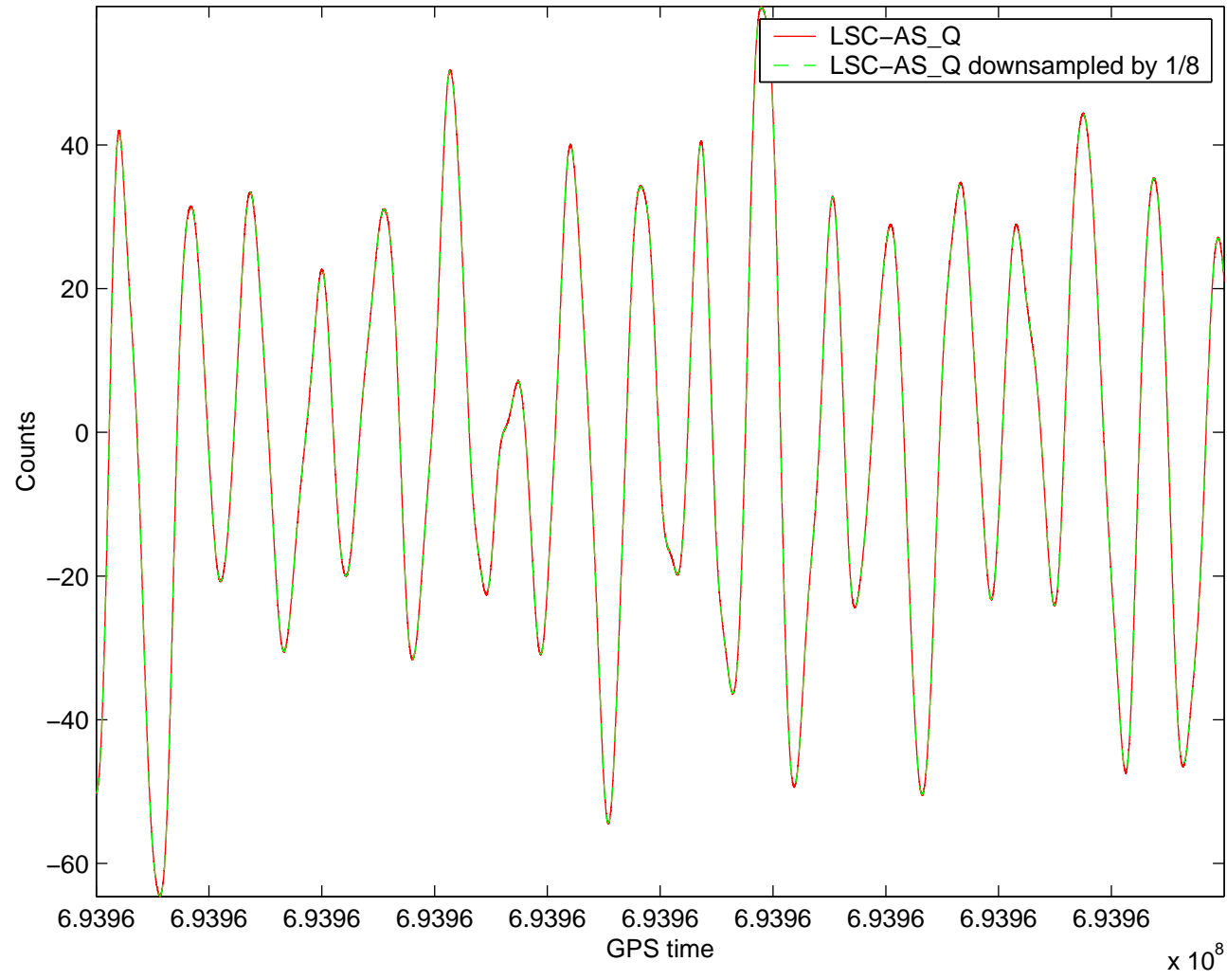
<http://www.ldas-dev.ligo.caltech.edu/doc/userAPI/html/createRDS.html>

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- Example:

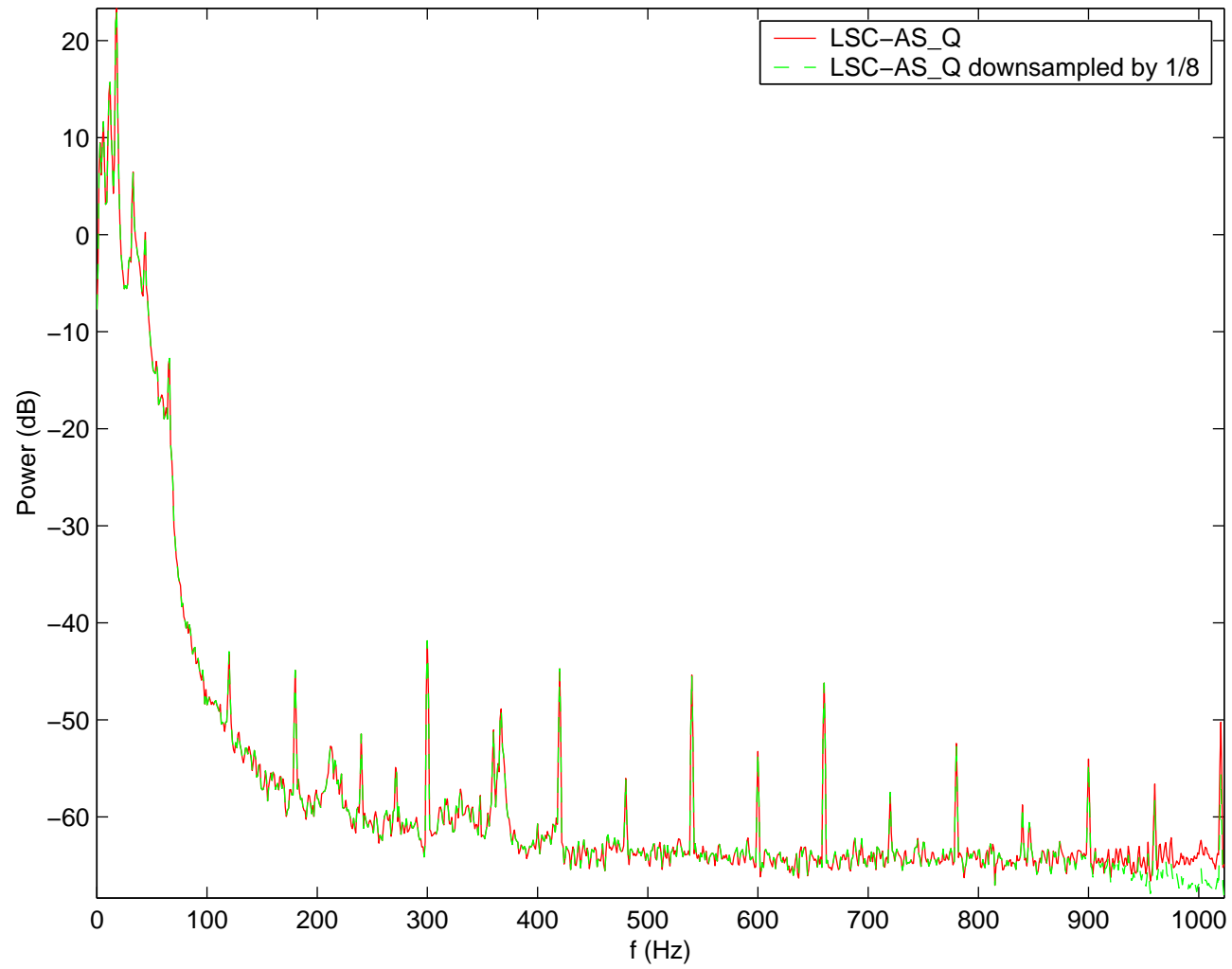
createRDS

```
-times { 693960016–693960175 }  
-ifo { H }  
-type { R }  
-channels { H0:PEM-LVEA_SEISZ H1:LSC-AS_Q!8 }  
-usejobdirs { 0 }  
-outputdir { /ldas_outgoing/frames/RDS }
```

Comparison of raw and downsampled data



Spectra of raw and downsampled data



Spectrum of 50 Hz highpass IIR-filtered data

