

Stochastic Group Status



G. CELLA

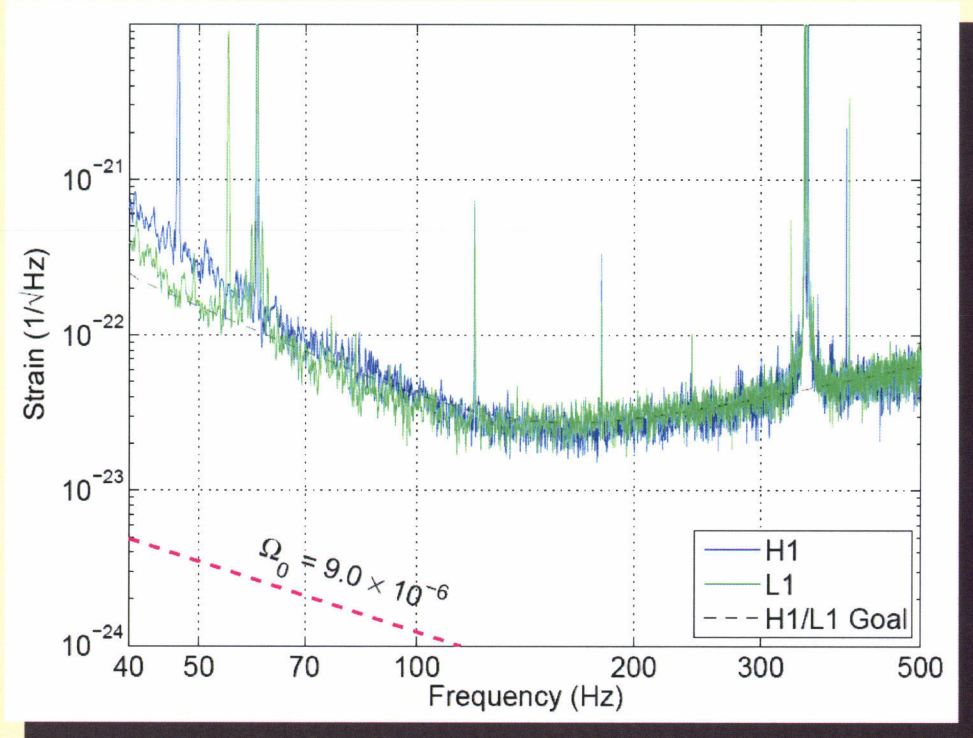
ON BEHALF OF THE ISC/VIRGO STOCHASTIC GROUP

Update on isotropic search: Analyzed Data



- New result uses data up to Jan 22, 2007.
 - About 140 days of effective observing time.
- Currently analyzing the rest of the run:
 - Duty cycle and sensitivity improved during the run.
 - Expect 2x more data and ~2x better final sensitivity.
 - Expect to complete the analysis ~2 months after v4 h(t) is available.
- Also looking at H2L1.
 - Expect ~10% sensitivity improvement.

Typical strain sensitivities during S5.

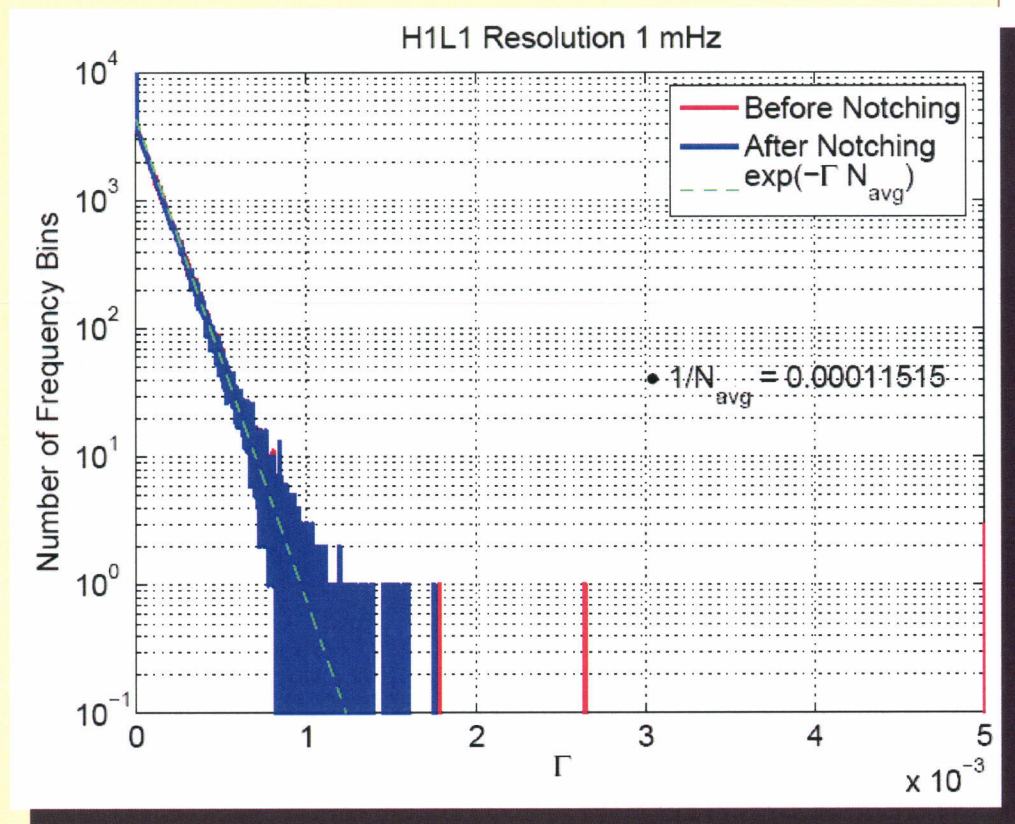


S5: H1L1 Coherence



- Calculated using S5 data up to 04/07.
 - Using the same data segments as in stochastic analysis.
- Very clean:
 - 48.0 Hz (3rd harmonic of 16 Hz).
 - 108.85 Hz – simulated pulsar.
 - 60 Hz (only 0.1 Hz resolution).
 - Additional very weak lines at 46.45 Hz and 47.58 Hz (10 mHz resolution).
 - ✦ Likely instrumental.
 - ✦ Notching them has negligible effect on the final result.
 - ✦ Currently still included.
- No sign of the 1 Hz harmonics, which were present in the S4 search.

$$\text{Coh} = \text{CSD}^2 / \text{PSD}_1 / \text{PSD}_2$$

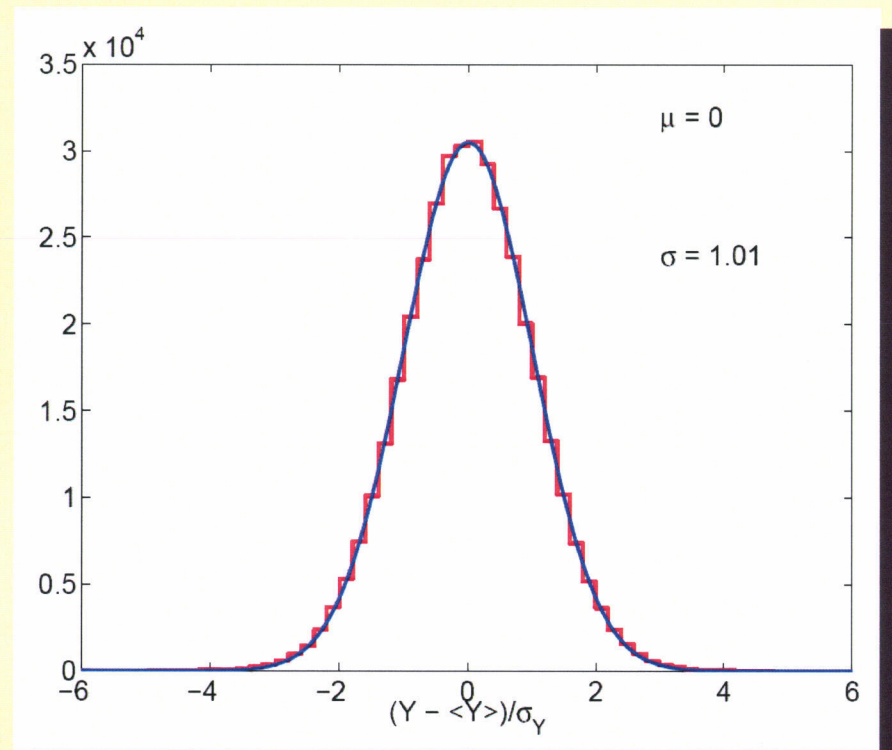


S5: Data Quality



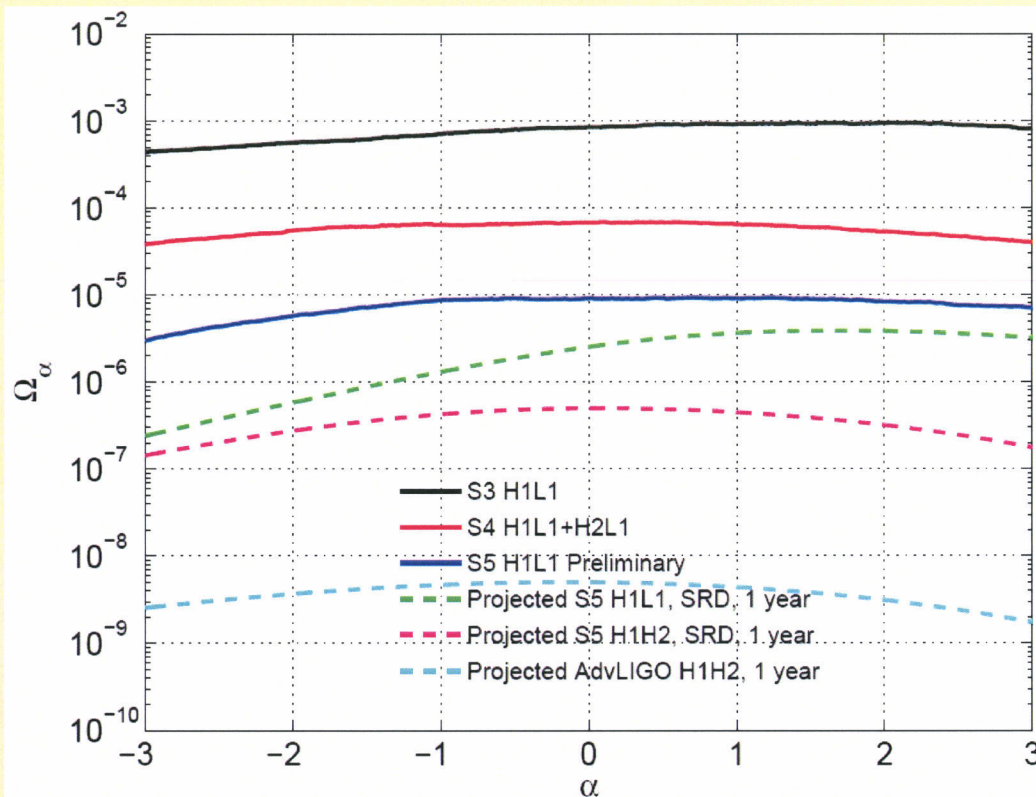
- I Frequency notches:
 - » 48.0 Hz
 - » 60 Hz harmonics
 - » Simulated pulsar lines
- I Data Quality Cuts:
 - » Require $|\sigma_{i\pm 1} - \sigma_i| / \sigma_i < 20\%$ (removes 4-5% of the segments).
 - » Reject a handful of segments identified to contain glitches in coherence studies.
- I All cuts defined **blindly** (with unphysical time-shift).
 - » Exception: a stretch of data was found to have bad v3 h(t) after the box was opened.
- I Residual distribution consistent with gaussian.
 - » Passes the Kolmogorov-Smirnov test.

Residual distribution
is Gaussian.



Reach as a Function of Spectral Slope

$$\Omega_t(f) = \Omega_\alpha (f/100 \text{ Hz})^\alpha$$



- S3 H1L1: Bayesian 90% UL.
- S4 H1L1+H2L1: Bayesian 90% UL.
- S5 H1L1 preliminary: Bayesian 90% UL.
- Expected S5: design strain sensitivity and 1 year exposure.
- AdvLIGO: sensitivity optimized for binary neutron star search, and 1 year exposure.