

LSC Six-Month Progress Report

Organization: Balearic Islands University Relativity Group (UIBRG)

Report Date: August 15, 2003

a) Detector Characterization:

Sintes has been leading the GEO detector characterization efforts and serve as liaison between GEO and LIGO/LSC on detector characterization matters. She co-organized the GEO meeting, April 3-5, 2003 that took place in Hannover. http://www.aei.mpg.de/~sintes/GEO_DC/
A technical document: *Y Itoh, S Berger, S Mohanty, A M Sintes and S Babak, "Quantiles Based Automated Line Detection" LIGO-T030175-00-0-Z* was prepared.

b) Periodic Sources Upper Limit Group:

Sintes is a member of the PSUL group, and she represented the group at the Recontres de Moriond on March 25th, 2003.

c) Hough Hierarchical Pulsar Algorithm:

In collaboration with AEI, we have developed two flavors of the Hough transform able to deal with (a) demodulated data (DeFT, output of the F-statistics) and (b) non-demodulated SFT data. Both versions have been implemented and merged together with the existing LAL houghpulsar package.

As presented at the August LSC meeting [G030517-00, G030518-00], a driver code for a particular pipeline is already in place. This is able to analyze non-demodulated SFT data for isolated pulsars using spin-down parameters. Test and validation codes have also been produced and they are under CVS control at AEI. A set of auxiliary functions C-LAL compliant has also been developed. These are able to read SFT data; select peaks from a periodogram in both white or color noise; perform statistical analysis of the Hough maps and compute average velocity and position of a given detector and time interval.

Under development is the implementation of a robust PSD estimator based on running median; the Monte-Carlo signal injection analysis code, in order to be able to set upper limits using a frequentist approach and also calibrate the code; the input search parameter files and condor submission jobs.

Preliminary results have been obtained using S2 data, using 1887 SFTs from H1 in the band 263-268 Hz. Many tests have been performed on simulated data to understand and characterize the performance of this strategy and compare with the theoretical expected statistics. For the incoherent Hough search, thresholds have been chosen by optimizing false dismissal for a fixed false alarm rate, and sensitivity has also been compared with a coherent directed search.