

Unbiased Search - Status Report

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Overview

- Approach
- Factors Affecting Efficiency
 - Doppler modulation
 - antenna pattern
- Data Quality
 - non-stationarity
- Plans for Future

Approach

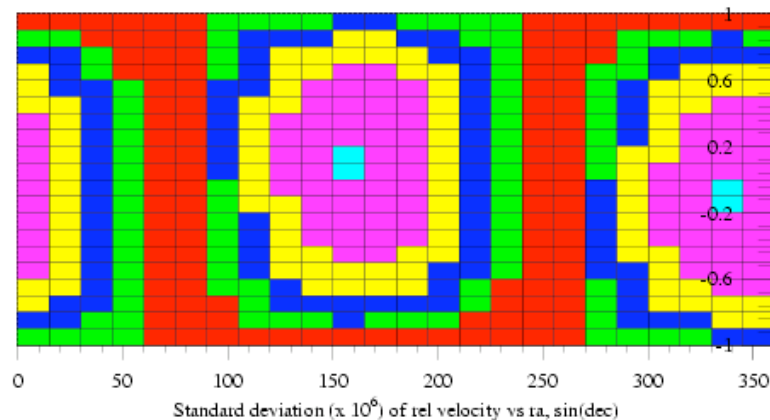
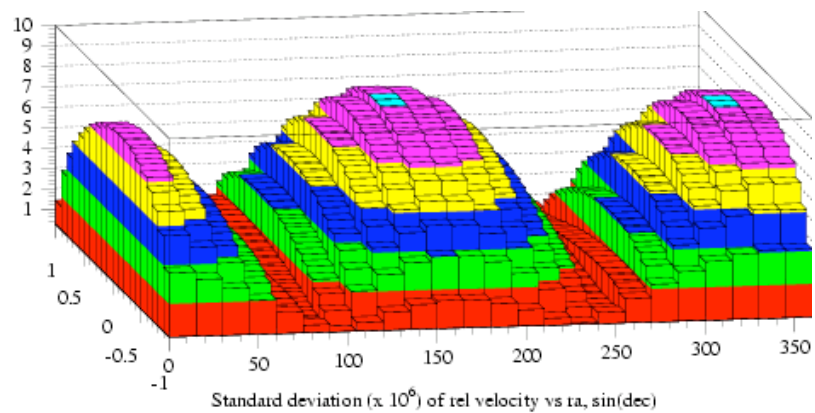
- Make few assumptions about nature of sources
- Estimate excess power based on estimation of background power
- Use averaged periodograms (SFTs of G.Mendell, and/or of B. Allen)
- Pros: low compute load => all-sky search; phase-insensitivity => robust against uncertainties in source params

Factors Affecting Efficiency

- Doppler modulation
- Antenna beam pattern
- “Pad percentage”, i.e. dead time fraction in one SFT
- Quality of lock: Rayleigh statistic

Doppler Modulation

- Regions of larger std deviation require searching broader freq bands for excess power

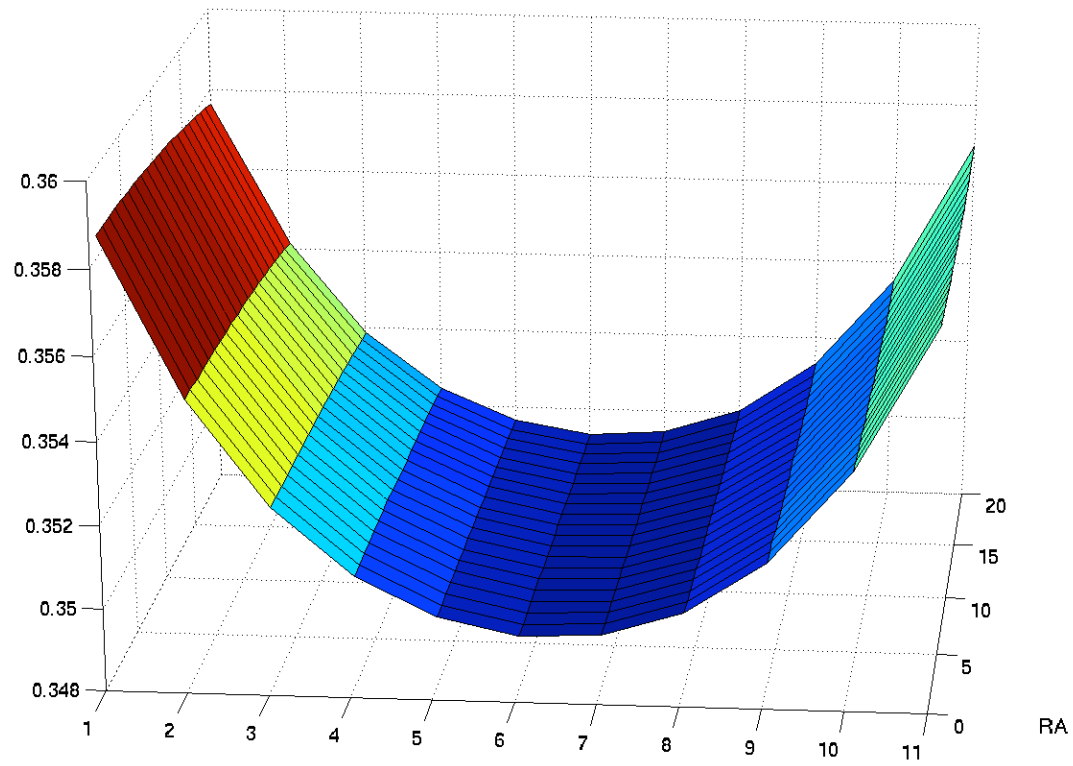


Antenna Pattern

- F_+ and F_x -- detector response is a function of position relative to source
- LAL contains routines in `lal-tools` package
 - some more tests added

Mixed

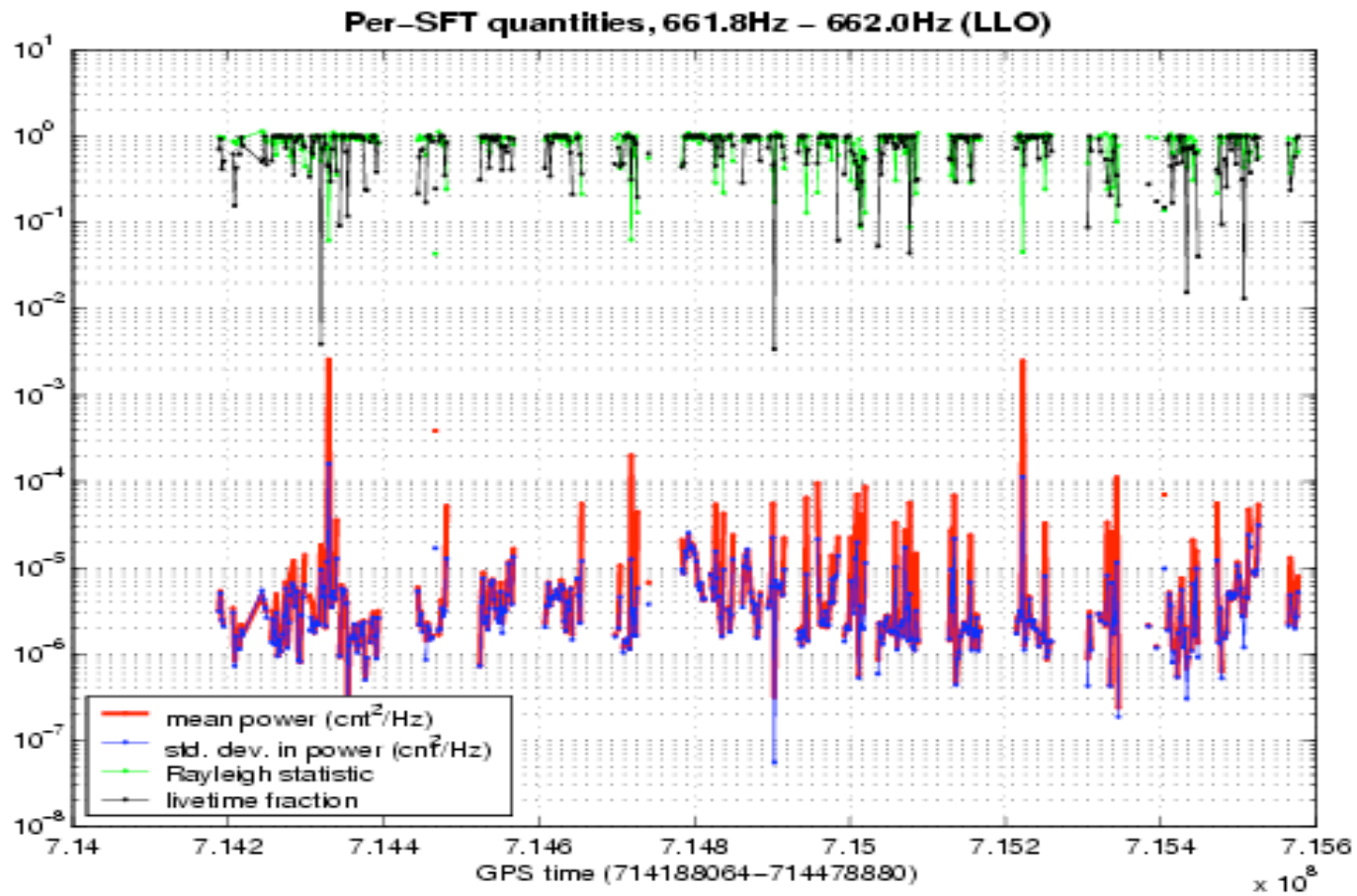
$(F_+^2 + F_x^2)$ averaged over all of S1



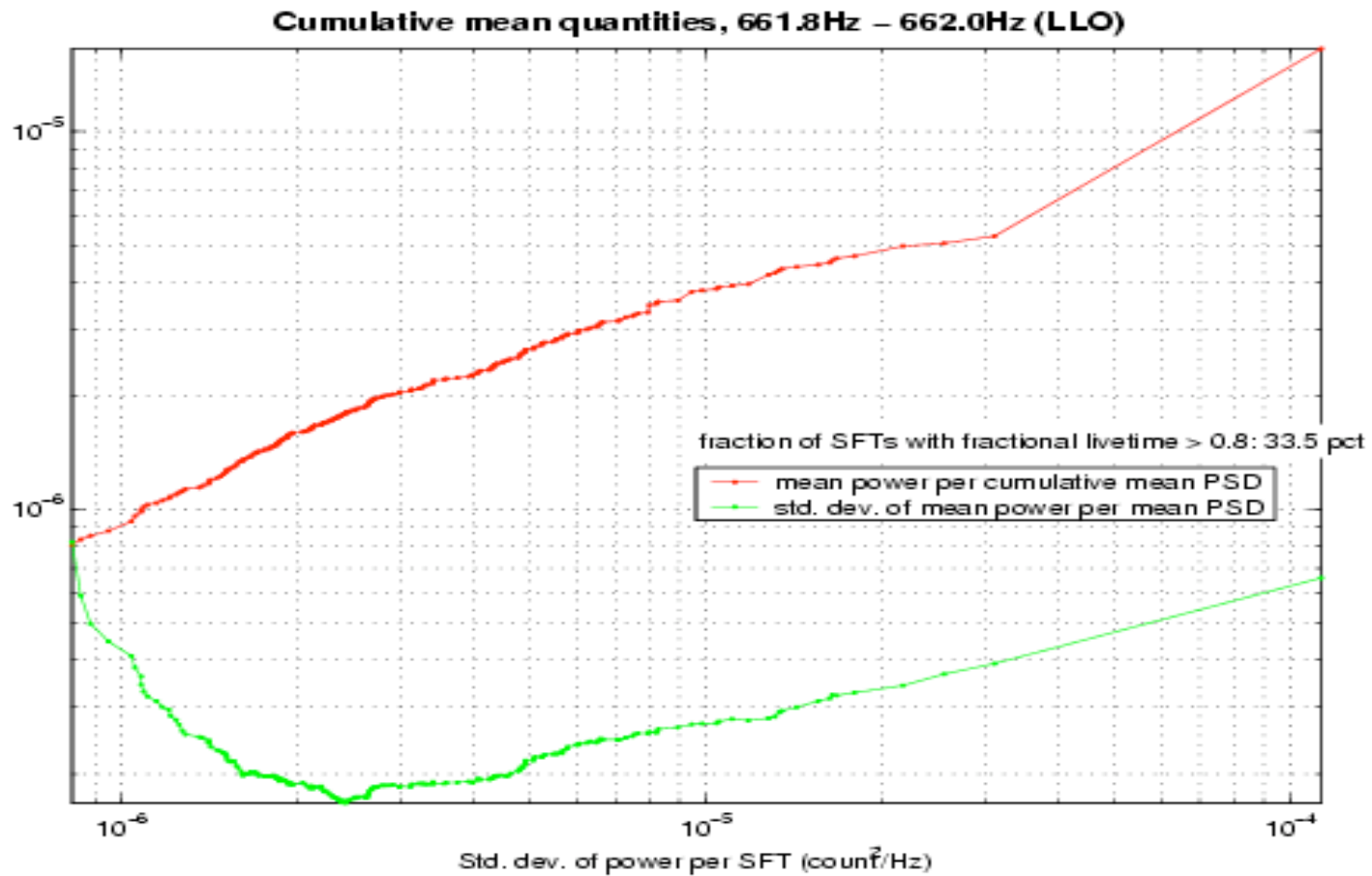
Time series of F 's avg'ed over sky



Non-Stationarity



Non-Stationarity



Plans for Future

- Future: software injections, Monte Carlo
- UWM Medusa for analysis -- calibrated SFTs by G. Mendell, and by B. Allen