03-22-2006

S4 ASI Veto for Inspiral Analysis

Jacob Slutsky
Louisiana State University
Detector Characterization Session

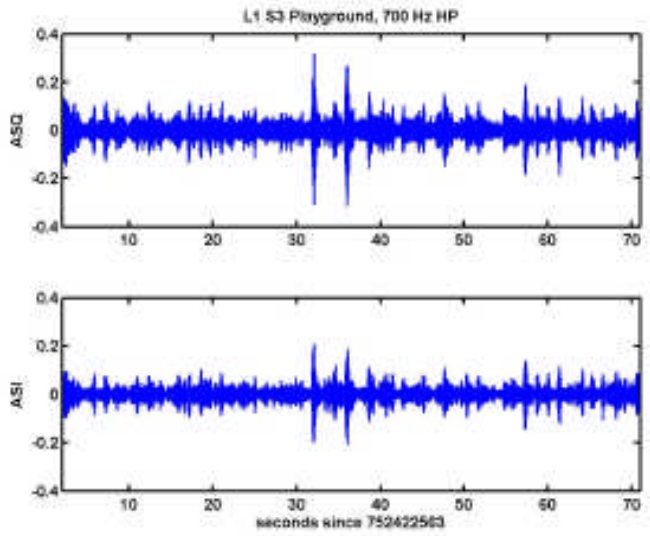
LIGO-G060156-00-Z

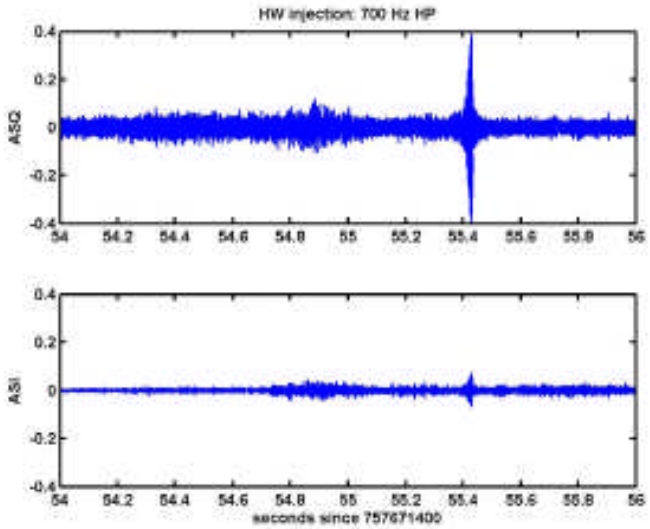
Overview

- Motivation
- Safety of hardware injections
- Efficiency of vetoing BNS triggers at high SNR
- Comparisons with Data Quality

Motivation

- Investigations of S3 loud inspiral false alarms by Chad Hanna
- Many glitches look to have nearly equal significance in ASI and ASQ in Kleinewelle triggers (generated by Lindy Blackburn of MIT)
- Hardware injections much stronger in ASQ



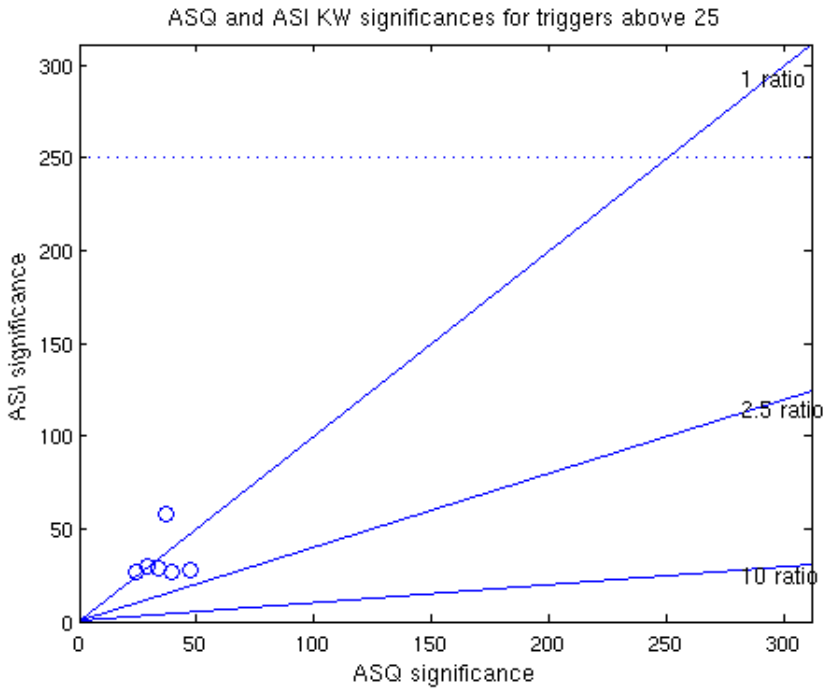


Parameters

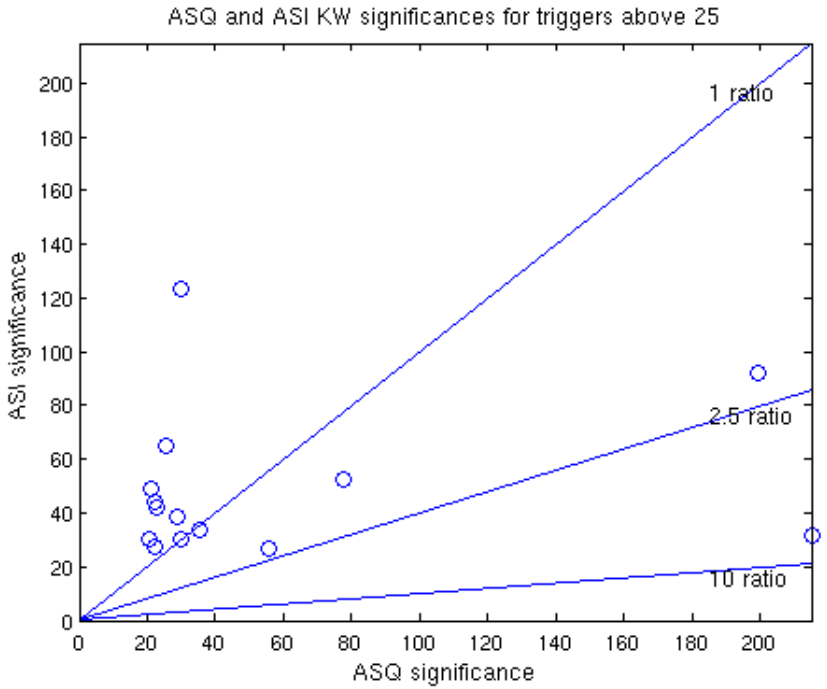
- Tuned by deadtime:
  - ASI Significance Threshold
  - Window size (-3, +8) largely unchanged since S3
- Tuned by safety:
  - Ratio of ASQ Significance / ASI Significance

Safety: Inspiral Hardware Injections

– H1-

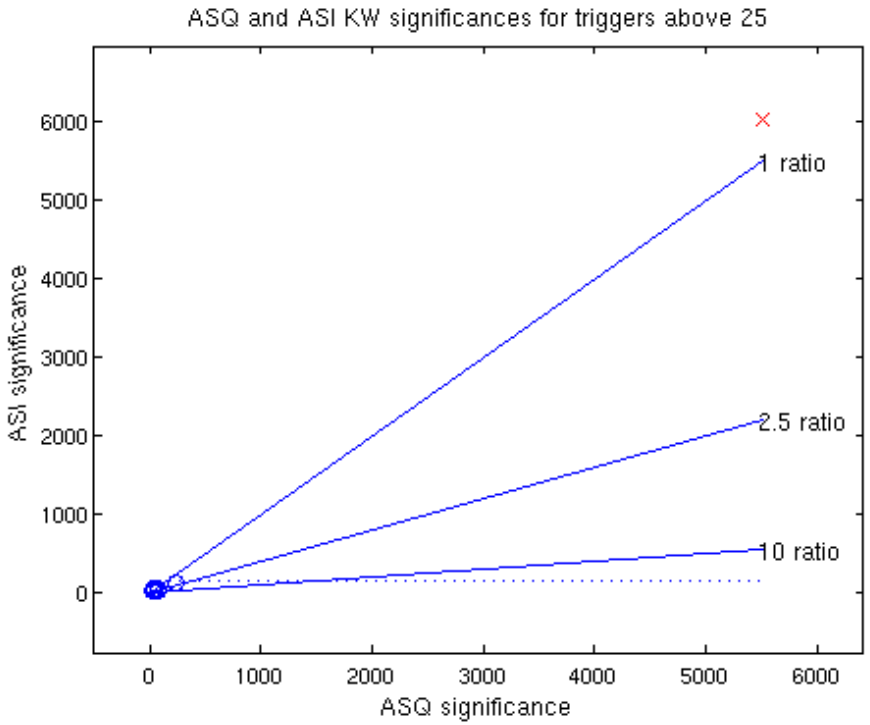


-L1-

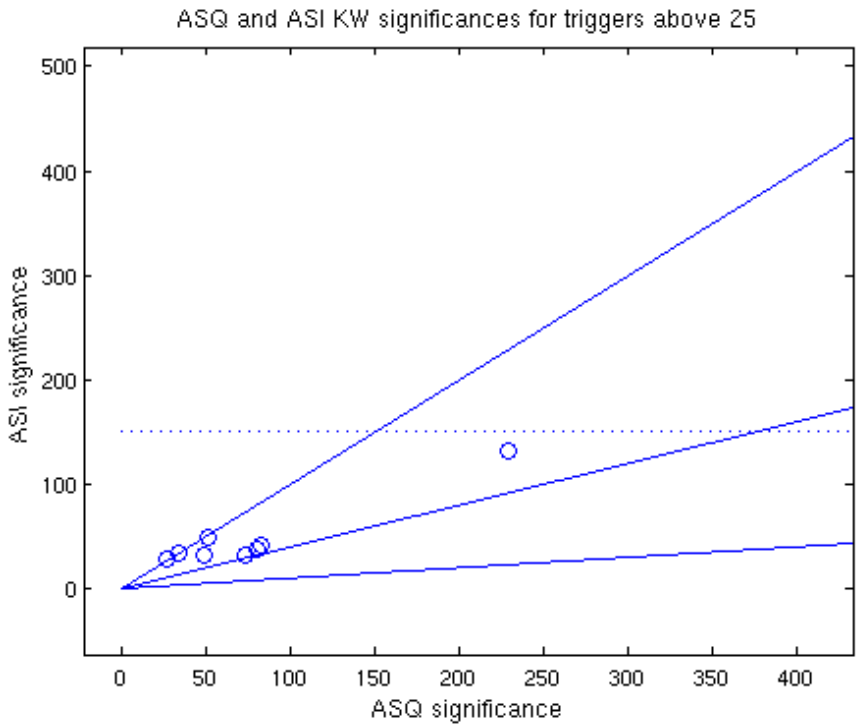


Safety: Inspiral Hardware Injections

– H2-

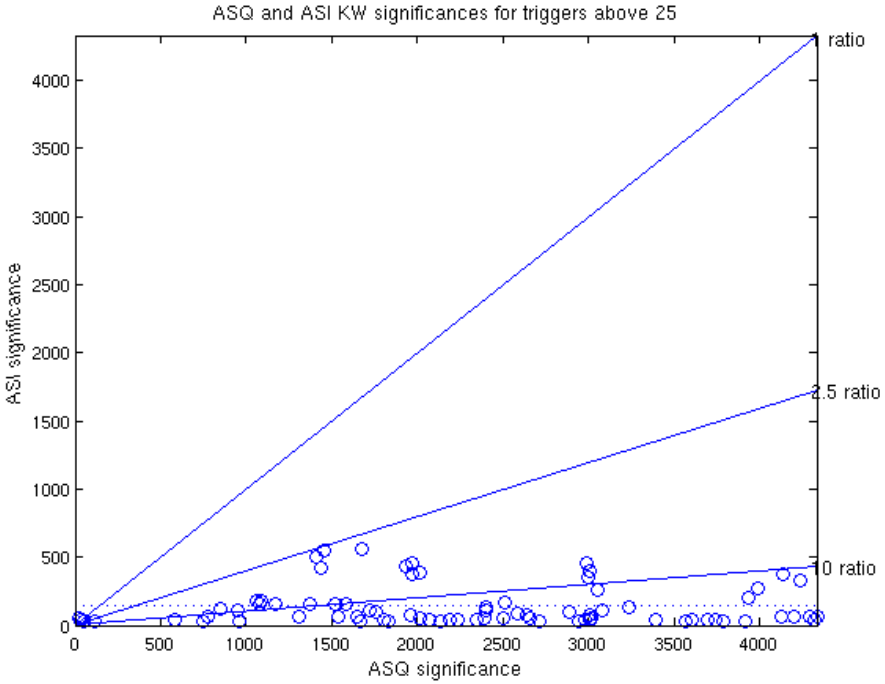


-H2-

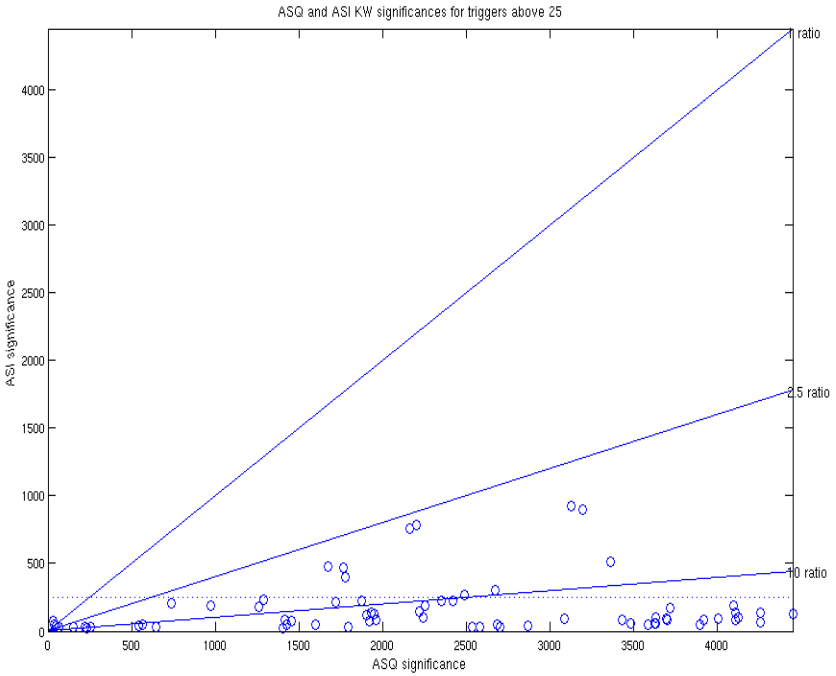


Safety: Burst Hardware Injections

– H1-

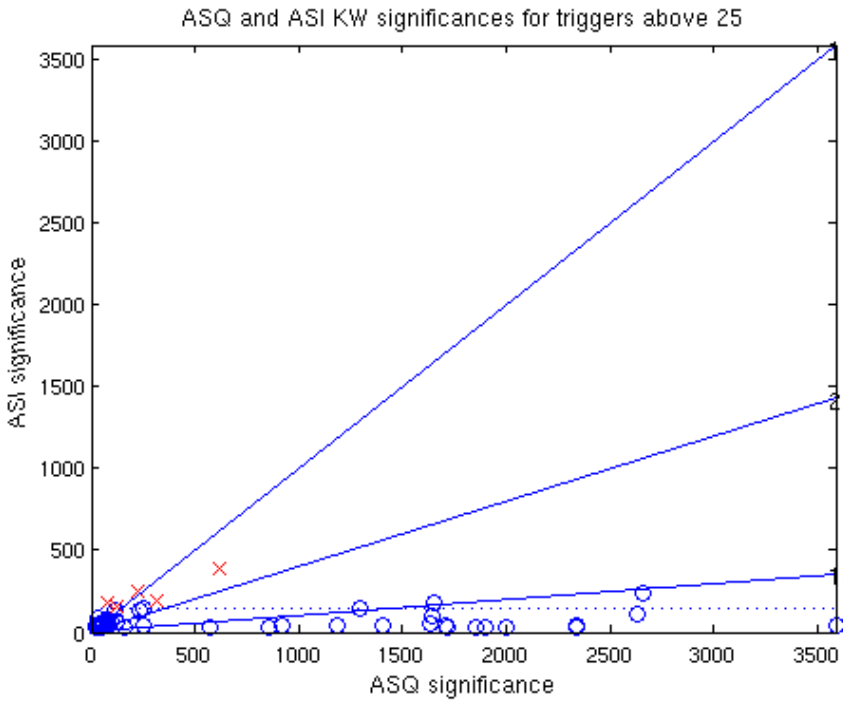


-L1-

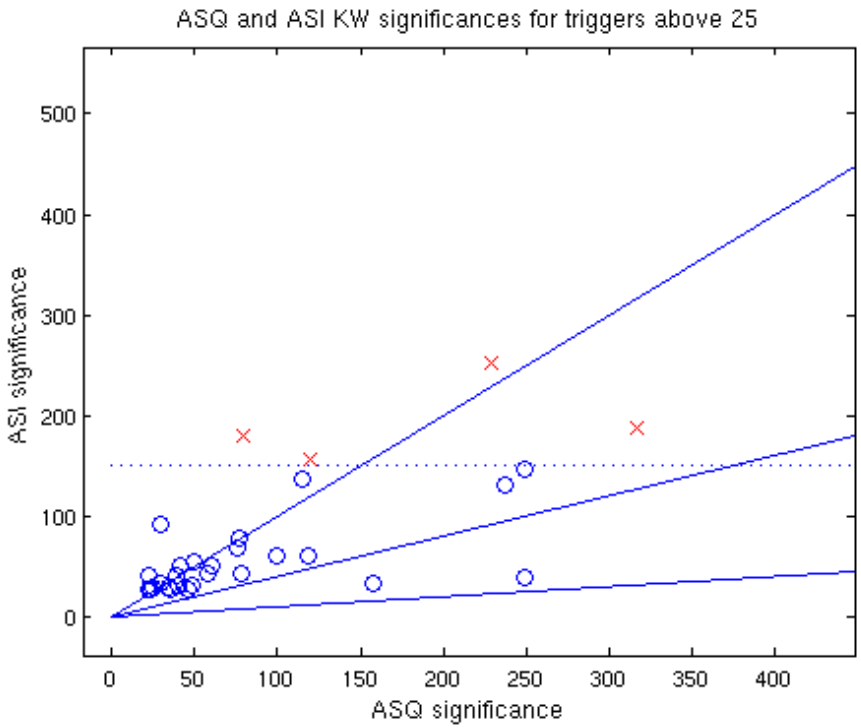


Safety: Burst Hardware Injections

– H2-



-H2-

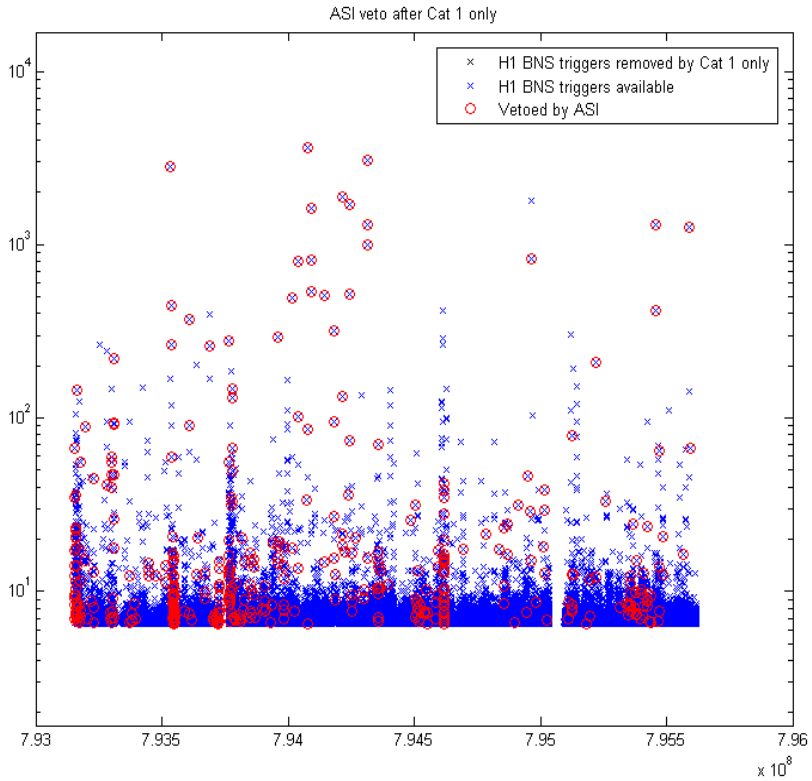


Parameters:

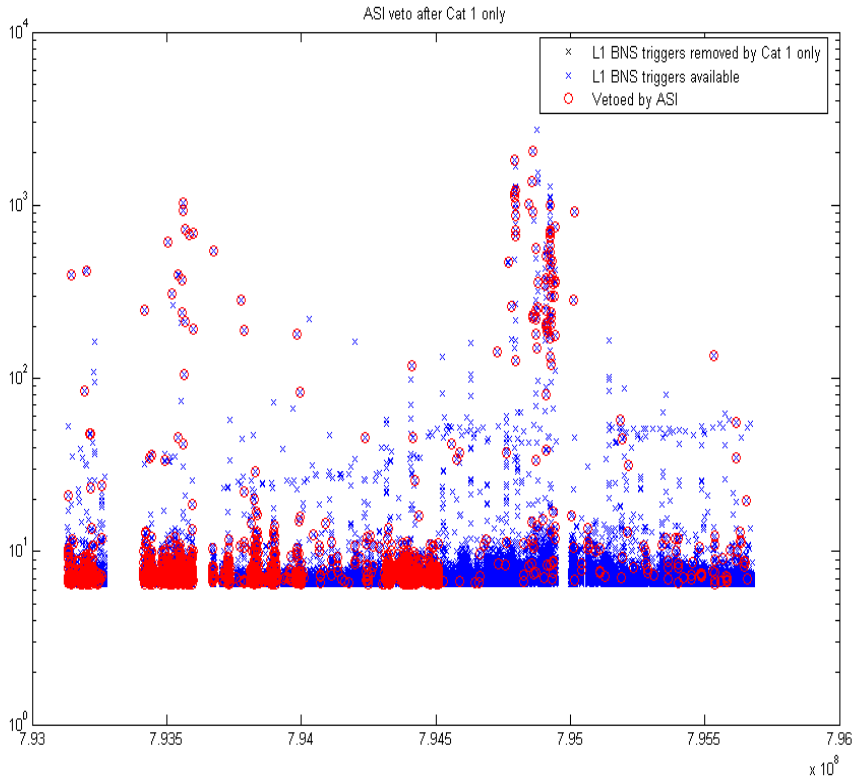
- H1
  - ASI Threshold 150
  - ASQ/ASI Ratio 2.5
- L1
  - ASI Threshold 250
  - ASQ/ASI Ratio 2.5
- H2
  - Not used

Efficiency: H1 and L1

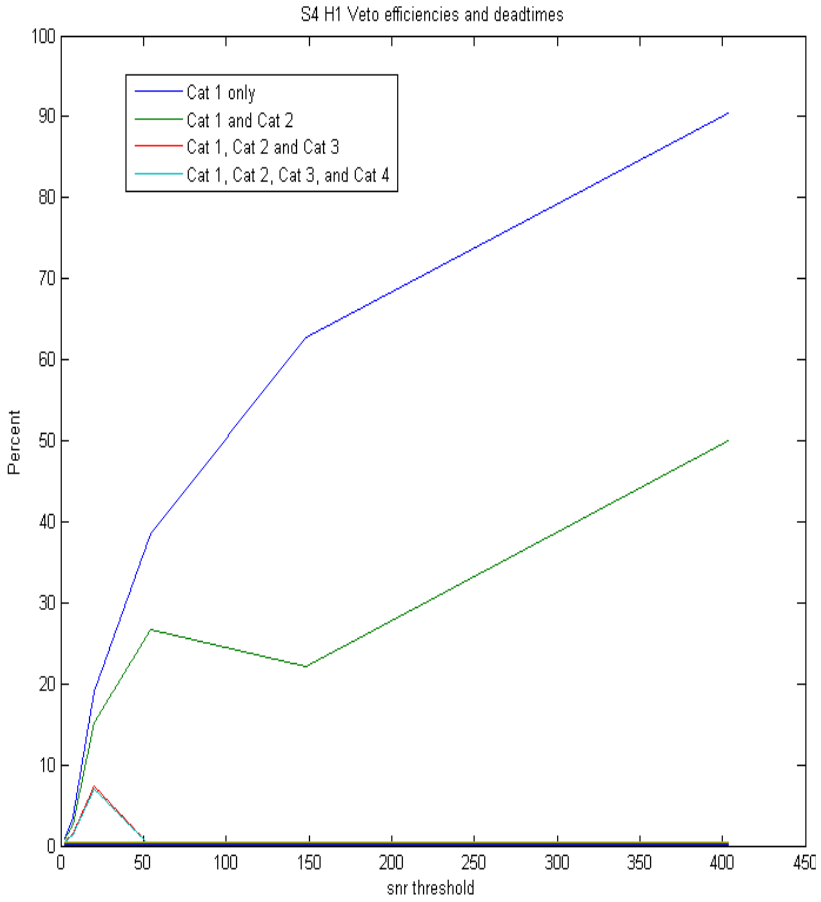
– H1-

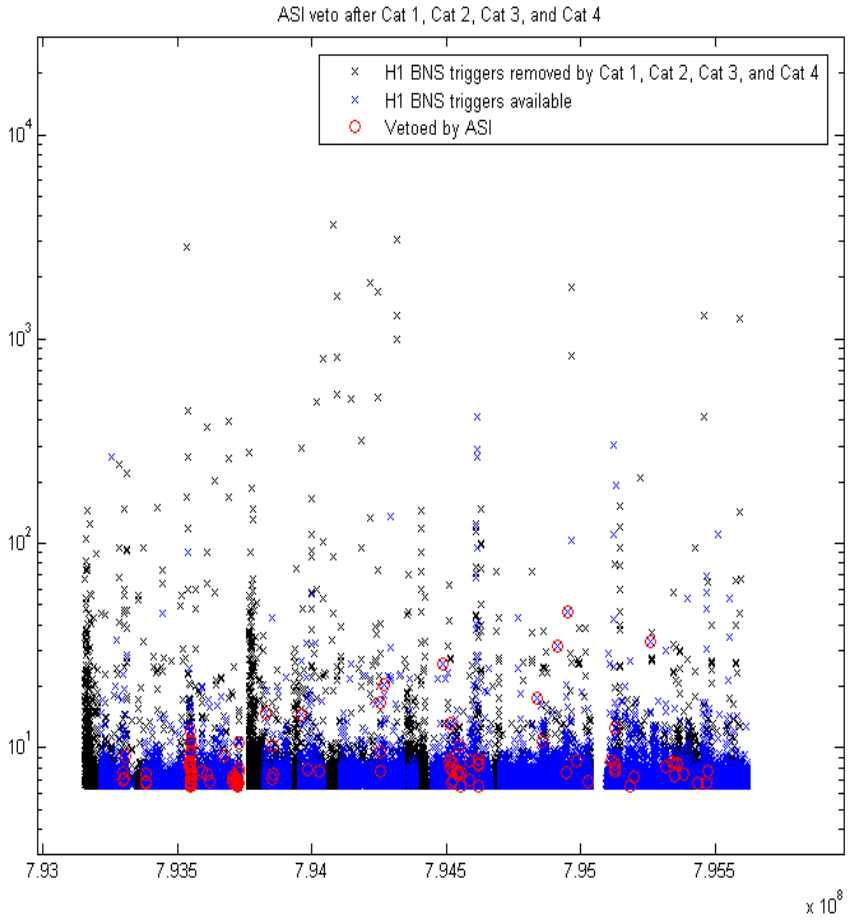


-L1-

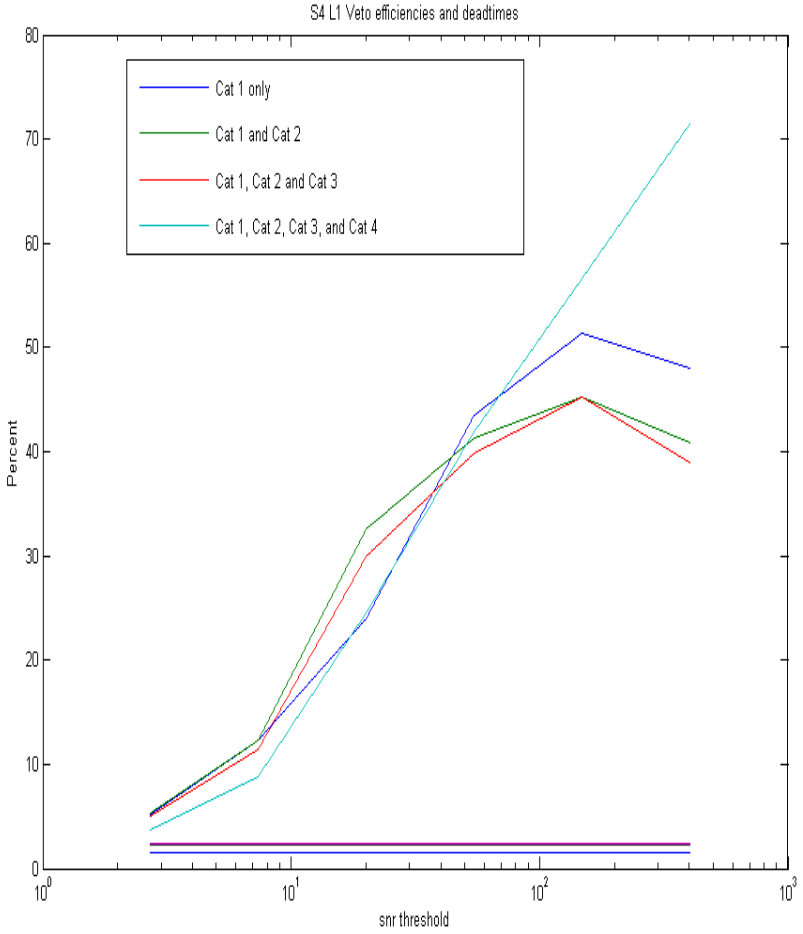


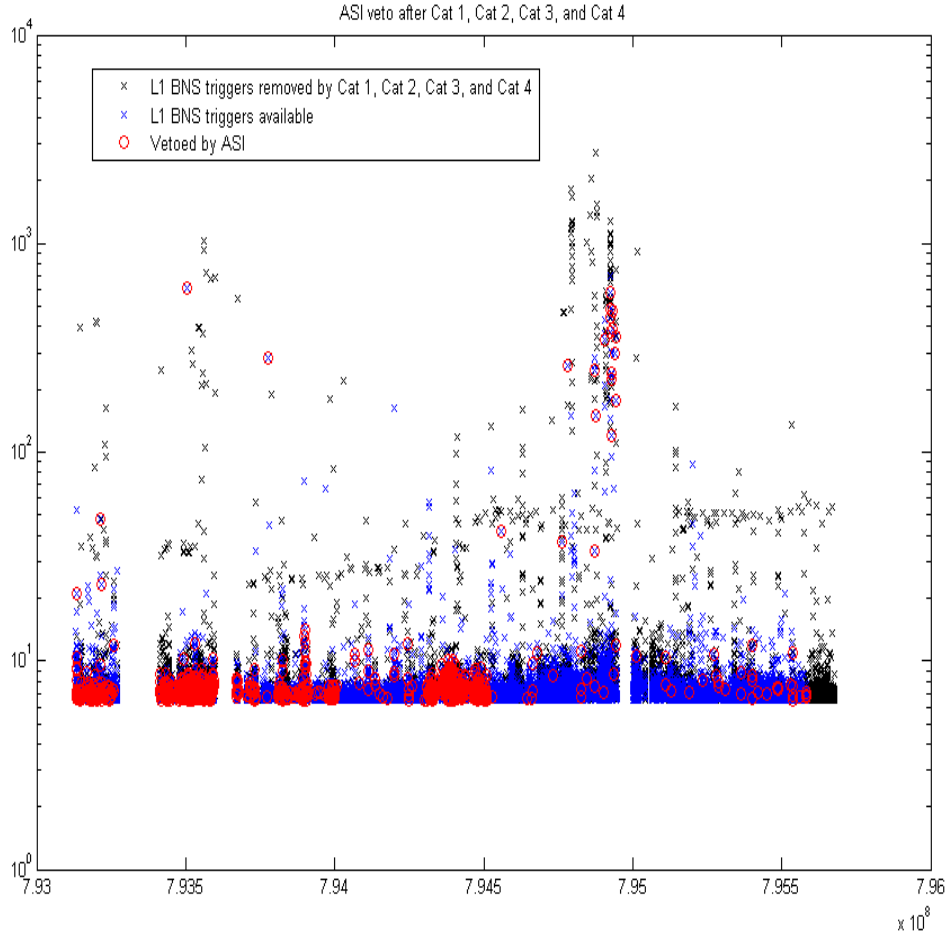
Efficiency:
H1 and Data Quality Flags





Efficiency:
L1 and Data Quality Flags





Summary

- H1
  - Efficiency above snr of 6.5 = 1.06%
  - Only veto for many BNS clusters with snr ~ 25
  - Deadtime = 0.52%
- L1
  - Efficiency above snr of 6.5 = 5.12%
  - Efficiency above snr of 400 ~ 50% to 70%
  - Deadtime = 2.34%