Search Details

• Instruments analyzed independently, thresholds:
  – $\rho > 7$ and $\chi^2 < 5.0 \{15 + (0.15 \rho)^2\}$ for LIGO
  – $\rho > 7$ and $\chi^2 < 2.4 \{16 + (0.185 \rho)^2\}$ for TAMA

• List of triggers exchanged and tested for coincidence
  – Time coincidence window
    • TAMA-LLO 35 ms (light travel time 32.2 ms)
    • TAMA-LHO 27 ms (light travel time 24.9 ms)
  – Chirp mass coincidence window 0.05 $M_\odot$

• Before performing search, study
  – background by performing time slides
  – evaluate search efficiency with injected signals
Time Slide Analysis

- We can estimate the background of (noise generated) coincidences by performing time slides
  - We have analyzed the playground data and
  - Performed 100 time slides of +/- 5, 10, ... 250 seconds of TAMA triggers relative to LIGO triggers

![Graph of LIGO SNR vs TAMA SNR with preliminary note]
Injection Analysis

- Inject galactic BNS inspirals into both LIGO and TAMA data
  - component masses of 1-3 M⊙
  - exchange triggers within 1 minute of injections

- Majority of “missed” injections are too distant to be seen in TAMA.

- Preliminary studies indicate search is sensitive to 0.78 MWEG.
Effective distances

- LIGO and TAMA have very different antenna patterns.

- Can obtain large ratios of effective distance
  - factor of 10 not uncommon

- Despite this, injections are distinct from the background.

Preliminary
Combining Triggers

- We need a coherent statistic to combine triggers
  - LIGO used $\rho^2$ in S2 analysis.
  - TAMA used $\rho/\sqrt{\chi^2}$ in TAMA-LISM analysis.
  - Both excellent at distinguishing injections from background.
Summary

• Search for galactic BNS in S2/DT8
  – search 650 hours not used in LIGO S2 search
  – data analyzed independently and triggers exchanged

• Playground analysis
  – time slides to estimate background
  – injections give preliminary sensitivity to 0.78 MWEG

• To do ...
  – finalise coherent statistic
  – search full data set