



Status of Burst Upper Limit Working Group Work

Alan Weinstein for the Burst working group

E7 Lessons Learned review

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Burst upper limits working group

- At least 35 members from LIGO and LSC
- Chairs: Sam Finn and Peter Saulson
- Web page: <http://www.ligo.caltech.edu/~ajw/bursts/bursts.html>
- Active, archived email list: bursts@gravity.phys.psu.edu
- Elog of E7 & related activities: <http://cosmos.nirvana.phys.psu.edu/enote/>
- BiWeekly telecons, sub-group meetings
- Subgroups and sub-chairs:
 - » LDAS-based burst filters (“DSO’s”) – Erik Katsavounidis
 - » Data conditioning – Sam Finn
 - » IFO diagnostics – David Shoemaker
 - » Trigger and Vetos – John Zweizig
 - » Simulations, efficiency evaluation – Alan Weinstein
 - » Coincident Event analysis tools – Daniel Sigg
 - » External Triggers – Szabi Marka



Prior to E7:

- The group is preparing:
 - » LDAS-based burst filters for generating GW triggers in database – see next bullet
 - » DMT-based database triggers for environmental and/or IFO-based vetos – Zweizig
 - » ROOT-based database-trigger (“event”) analysis to find coincidences, apply quality cuts, apply vetos, evaluate fake rates and efficiencies – Sigg, Ito
- Three LDAS/LAL-based filters (DSOs) under active development:
 - » Excess POWER filter – Katsavounidis/Brady
 - » TFCLUSTERS – Sylvestre
 - » SLOPE filter – Daw
- Very fruitful “Scientific Interpretation Summit“ at U. Maryland
 - » hosted by Joan Centrella, Dec 7-9 2001
 - » many astrophysicists (GSFC, etc) in attendance
- Technical notes (paper drafts) in preparation, and secretaries:
 - » “Instrument-based” Search - Saulson
 - » Search for astrophysics-inspired waveforms - Finn
 - » Coincidences with external (GRB) triggers - Kalogera



Plan of attack for Burst search in E7 and beyond

- E7 activities:
 - » All three DSOs running during E7, on LDAS at LHO and LLO
 - » POWER and TFCLUSTERS ran continuously throughout E7
 - » Scientist studies of the origin of bursts in AS_Q – Saulson (LLO), Raab et al (LHO)
 - » Accumulation of GRB triggers into database - Marka
- First studies of E7 Burst and DMT trigger rates – Katsavounidis, 1/12/02
<http://www.mit.edu/~kats/ligo/e7/index.html>
- Currently using E7 playground data, and calibrated signal injection (at DatacondAPI) to evaluate fake rates and efficiencies, begin tuning of DSO algorithms, thresholds, cuts, parameters
 - » LDAS-MIT devoted to this work
- Deep Mine search for effective vetos – Schofield, Rahkola, Zweizig, etc
- inter-detector correlation trigger study – Marka, Rahkola



Activities for next 3 months

- Finalize and tune parameters for burst search filters
 - » All tuning done with “playground” data, as compiled by Gonzalez/Chin/Shawhan/Brady, and simulations, only. Use LDAS-MIT.
 - Finalize use of ALLEGRO and GRB data
 - Identify, finalize and tune DMT vetos
 - Use simulations to evaluate efficiency for various burst morphologies
 - Exercise Coincident Event Tool to find coincidences, establish fake rates, apply vetos, evaluate efficiency and livetime
 - Freeze all veto and search filters, and run through full E7 data sample
 - Develop and commission burst search status displays for feedback to operators in control room
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- Instrument-based search: Establish rates/limits on bursts vs $h_{\text{peak}} / h_{\text{rms}}, f_{\text{cent}}, \Delta f$
 - Astrophysics-based search: Establish rates/limits on bursts vs $h_{\text{rms}}, \text{waveform}$
 - Search for external trigger coincidences (GEO, ALLEGRO, GRB)
 - WRITE TECHNICAL NOTES (PAPERS?)
 - BE READY FOR S1