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LIGO-G030621-00-E

Overview of E10 / S3 Hardware Injections

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LIGO Scientific Collaboration Meeting
November 13, 2003

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Overview of Injections

Software allows arbitrary waveforms to be injected

- Synchronized to GPS clock

For E10 / S3, we are injecting into ETMX

- Calibration lines are on DARM_CTRL
- Excitations on other channels are prohibited during science mode data by state vector code
- Non-trivial actuation transfer function

Injected waveforms are recorded in frame files

- Channel names: *:LSC-ETMX_EXC_DAQ
- Relies on testpoint being active;
  state vector code requires this as a condition for science mode data

Transient Injections

Bursts, inspirals, …

Various amplitudes

Bursts (so far, only sine-Gaussians) being injected 10 seconds apart

Occasional sessions during the run

Hope for multiple locked interferometers, but not essential

Not science mode data, but we plan to include in Data Quality segment lists

Long-Term Injections

Simulated pulsar and/or stochastic signals

Inject during science mode running

Injected signals are weak enough to have little effect on overall noise

Waveforms are calculated on the fly

Dedicated computers at LHO; control14 at LLO

Frequently interrupted by other activities using excitations, but restarts automatically

Run plan

Keep pulsar injections on for whole (?) S3 run

Injected stochastic signal for a few hours last week;
plan to inject weaker signals for a somewhat longer time later in S3 run