Detector Characterization Activities and plans

Kazuhiro Hayama
(Fukuoka University)

Scope

Detector Diagnostics | **Data Quality Information** | **Veto Analysis**

Tasks

DetChar tools

- Non-Stationary
- Line
- Gaussianity
- Time-Series Spectrum
- GW range
- Correlation
- etc.
- User Interface
  - command line
  - webbased
- Monitoring Pages
- Summary Pages
- Logistics support 体制
  - DetChar Shifts

Environmental Monitors

- Sensors Preparation
- Connection
- PEM Injection
- Arm mapping
- Site Study
  - magnetic field
  - water gravity

Data Quality

- DQ flag
- DQ application

KGWG DET

- CAGMon
- EtaGen
- Safe cha. Study
- Machine Learning for Glitch Class.
- LIGO-Virgo DQ

Human resource

- **DET tools**
  - Hayama, KGWG(P. Jong, J. Oh, S.-H. Oh, Y.-M. Kim, E. Son), New postdoc
- **PEM**
  collaboration with GIF (Araya, Miyo)
  - Injection done in bKAGRA p1: Nagano, Shimoda, Miyazaki, Takano, Tanioka, Tanaka(U. Tokyo), Itoh, Kaihotsu, Kuromiya, Mori, K. Yamamoto(U. Toyama)
  - Noise modeling : Nishizawa, Sakuno, Somiya
- **DQ**
  - KGWG
  - Hayama, Kokeyama, ….
  - Require close collabolation with data-related subsystems

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DetChar tools

- Tools have been implemented and tested during iKAGRA (2016).
- During bKAGRA p1, these were stopped.
- The system has been updated during bKAGRA p1

  and working at the CDS network.
- Development of user interface will be improved drastically soon with the close collaboration with Eguchi-san in Fukuoka Univ.

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PEM preparation

Seismometers are running all days. Michrophone, accelerameters, magnetometers were evaluated in the bKAGRA phase1.
See Miyo-san’s and Nagano-san’s talks.

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bKAGRA phase 1

We focus on the establishment of the PEM injection.

See Nagano-san’s talk

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Water gravity noise

- Modeling and estimation of the effect to KAGRA have been done. The effect are almost negligible except extreme water flows (Nishizawa)
- Validation of the model using CFD is on-going (Sakuno (Hayama Lab), Somiya Lab)

Modeling Magnetic field in the mine

- Collaboration with geophysics scientist at the ERI.
- T. Ogawa (ERI) has bult the model of the magnetic field in the mine.

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DQ Flags

- Tools to evaluate the DQ has been finished.
- KGWG group is applying the LIGO DQ tools (hveto, omicron) to the KAGRA data(Pil Johng, Y.-M. Kim). The DQ will be evaluated with the same threshold as LIGO.
- Kokeyama-san will join the activities at the KAGRA site.

KGWG DET leading projects

See J. Oh's talk

- Safe Channel Study
  - To decide which channels can be used for multi-channel veto analysis(hveto)
  - Consistency of LIGO-Virgo DQ.
- Correlation Analysis
  To find linear or non-linear correlation between channels. (CAGMon)
- Multi-channel analysis
  To find coincident events between channels and to localize noise source. (hveto)
- Glitch characterization
  To characterizing burst-like events(glitches) for identifying noise source and Veto analysis. (EtaGen)

Important

- To fix schedule toward the O3 observation.

- DET tools
  (Urgent: resume diagnostics tools, daily summary)
- PEM
- DQ flags