

Japanese Physical Society. Annual Meeting 2019

Name: Enzo Tapia

Email: enzo.tapia@nao.ac.jp

Email 2: enzo.tapia.smart@gmail.com

Lecture title: Performance of the beam splitter and signal recycling suspensions for the **KAGRA** gravitational wave detector.

Affiliation names: NAOJ, ICRR^{AA}, The University of Tokyo^{BA}, The Chinese University of Hong Kong^{CA}, Wuhan Institute of Physics and Mathematics^{DA}.

Names: Tapia;Enzo, Barton;Mark, Hirata;Naoatsu, Peña;Fabian^{AA}, Trozzo;Lucia^{AA}, Kozu;Ryohei^{AA}, Fujii;Yoshinori^{BA}, Tsang;Terrence^{CA}, Capocasa;Eleonora, Shoda;Ayaka, Huang;Panwei^{DA}, KAGRA collaboration.

Abstract:

KAGRA is a cryogenic laser interferometer gravitational wave detector in the Kamioka mine in Japan. The detector also incorporates **dual-recycled cavity-enhanced Michelson interferometer** configuration. The sensitivity of the detector can be improved by the application of signal recycling technic. Moreover, to detect gravitational waves, it is necessary to isolate suspended mirrors from environmental vibrations.

Three signal recycling mirrors and the beam splitter of **KAGRA** are suspended on **Type B suspensions**. They incorporate an inverted pendulum vibration isolation table and multiple levels of suspended masses with blade springs for additional horizontal and vertical vibration isolation. The installation has finished at the **KAGRA** site.

The diagonalization process at different stages of the **Type B suspensions**, the design and implementation of control loops are discussed. Finally the performance of the passive and active filters are described and compared with the requirements.