V24b Final design of TAMA 2D X-pendulum vibration isolation system

Mark A. Barton（東大宇宙線研）、内山隆（東大宇宙線研）、黒田和明（東大宇宙線研）、藤本眞克（国立天文台）

A two-dimensional X-pendulum system has been developed through several prototypes to provide low-frequency vibration isolation in the TAMA 300 m laser interferometric gravitational wave detector. The transfer function of the second prototype system was measured. The vibration performance is reasonable considering that not effort was made to improve the high-frequency dynamics. The final design is fully optimised, using the technique of percussive tuning. Using the transfer function results and a normal mode analysis of the system, the sizes and shapes of parts have been carefully tuned to ensure that elastic modes producing motion of the load table are excited as little as possible. In particular the X-plates have been much less tall, and the X-mechanisms have been brought to the same height as the centre of mass of the load table to avoid exciting the pitching modes of the X-plates and load.