

Research Report
ICRR Inter-University Research Program 2019

Research Subject: Study of high power in KAGRA Input Optics
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Summary of Research Result : KAGRA is a laser interferometer with two 3 km long arms for gravitational wave detection. The high-power laser system is an essential component of KAGRA to reduce the shot noise at high frequencies. The input laser power of 5 W for O3GK observation run and will have a higher power up to 80 W in the future. This research program aims the high-power test to study possible issues and to address them. We sent a student to the KAGRA site to work there. The student participated part of the work related to high power operation of KAGRA: <ul style="list-style-type: none">● High power beam shutter test. Modified the beam shutter driver, solved the heat problem of the beam shutter solenoid.● Installed the high-power beam dump made of two SiC plates to dump the high-power beam reflected by the power-recycling mirror.● Installed the shields on the suspension cages of the input mode matching telescopes. They are to protect the suspension fibers and signal cables from high-power beam exposures.● Implementation of the angular control scheme for the input mode cleaner (IMC) using wavefront sensors (WFSs). Measured the Gouy phases of the WFSs and configured the IMC reflection table.● Participated some commissioning work with Nakano before O3GK.

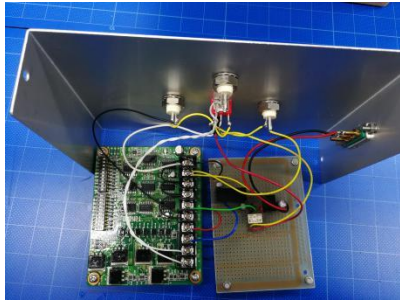


Fig. 1. Modified beam shutter driver.

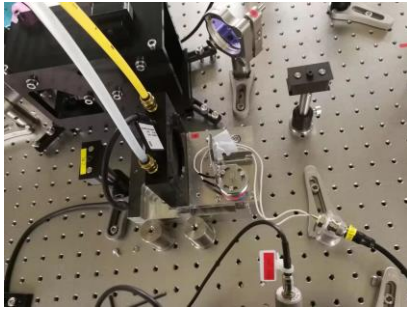


Fig. 2. Installed beam shutter on the laser table.

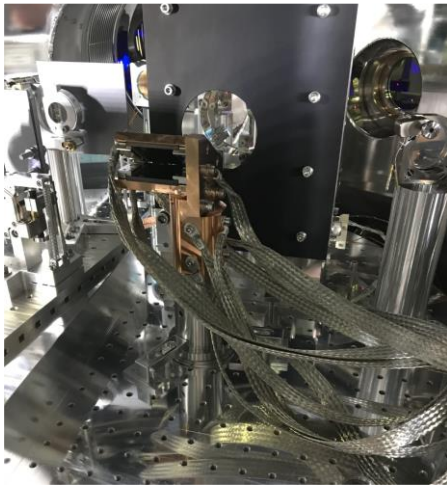


Fig. 3. Installed high-power beam dump in the vacuum chamber.

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