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Recent upgrade of KAGRA cryogenic payload

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Operating gravitational-wave detectors at cryogenic temperature has several technical difficulties. One known difficulty is an initial alignment of the interferometer. We have observed 150 μrad of pitch inclination drift of mirrors during cooling, which is larger than range of coil-magnet actuators of cryogenic payload. During bKAGRA Phase 1 operation, the first cryogenic operation of KAGRA, ball-screw-type moving masses were used for initial alignment and successfully aligned the mirrors. However, we found the long-term reliability problem of the moving mass later, commissioning term for O3. So, a new moving mass, which has a different moving mechanism from the old one, was developed and installed the cryogenic payload. In this talk, design and performance of new moving mass will be reported.

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