

PROSPECTS FOR UPGRADING THE KAGRA GRAVITATIONAL WAVE TELESCOPE

Yuta Michimura (KAGRA collaboration)^{1,*}

¹*Department of Physics, University of Tokyo, Bunkyo, Tokyo 113-0033, Japan*

(Dated: April 15, 2019)

The first direct detections of gravitational waves from binary black holes and binary neutron star systems by Advanced LIGO and Advanced Virgo have opened a vast new frontier in physics and astronomy. For better source localization and more precise binary parameter estimation, it is essential to extend the global network of advanced gravitational wave telescopes, with detectors such as KAGRA in Japan [1–4] and the third LIGO detector in India. It is also essential to upgrade these detectors to improve the sensitivity beyond their designed sensitivity.

Of all the state of the art detectors, KAGRA has two technologically unique features: it is constructed at a seismically quiet underground site, and it uses sapphire mirrors at cryogenic temperatures to reduce thermal noise. Therefore, KAGRA has unique potential and unique challenges to further improve its sensitivity [5].

In this talk, we discuss the prospects for improving the sensitivity of KAGRA detector, and describe possible scientific targets of upgraded KAGRA in the future.

* michimura@granite.phys.s.u-tokyo.ac.jp

- [1] K. Somiya (KAGRA Collaboration), *Classical Quantum Gravity* **29**, 124007 (2012).
- [2] Y. Aso, Y. Michimura, K. Somiya, M. Ando, O. Miyakawa, T. Sekiguchi, D. Tatsumi, and H. Yamamoto (The KAGRA Collaboration), *Phys. Rev. D* **88**, 043007 (2013).
- [3] T. Akutsu *et al.*(KAGRA Collaboration), *Prog. Theor. Exp. Phys.* **2018**, 013F01 (2018).
- [4] T. Akutsu *et al.*(KAGRA Collaboration), arXiv:1901.03569.
- [5] Y. Michimura, K. Komori, A. Nishizawa, H. Takeda, K. Nagano, Y. Enomoto, K. Hayama, K. Somiya, and M. Ando, *Phys. Rev. D* **97**, 122003 (2018).