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Research Result Report ICRR Inter-University Research Program 2023

Research Subject: Measuring the birefringence of the sapphire mirrors installed in the KAGRA detector

Principal Investigator: Keiko Kokeyama

Participating Researchers: Ms. Terri Pearce (PhD student, Cardiff University)

Summary of Research Result :

During this fiscal year, we have continued our local experiment at Cardiff University to establish the instrument of polarized phase camera. This upgraded version of a conventional phase camera detects two orthogonal polarized beams, enabling the birefringence measurement of a sample medium. We have successfully confirmed the basic functionality of a conventional phase camera, which includes measuring the amplitude and phase of a laser field. As the next step, we have successfully measured the rotation angle of the crystal axis and the beam propagation of a half wave plate. This is a basic functionality test, because this angle is known for the half wave plate case. Our preliminary measurement agreed with the expected angle (Fig. 1). Currently, we are focused on developing a calibration method to obtain the birefringence parameters.





