International Conference on the Physics of the Two Infinities



ID de Contribution: 72

Type: Non spécifié

## Fast birefringence measurement and compensation using a pair of identical liquid crystals.

mercredi 29 mars 2023 08:30 (15 minutes)

KAGRA operates at cryogenic temperature, therefore uses sapphire substrates as its test-masses. Next generation of gravitational wave detectors will also use crystalline substrates, possibly sapphire or silicon. All these materials are birefringent which can spoil both the sensitivity and duty-cycle of the detectors and therefore substrates with lowest possible birefringence are mandatory.

KAGRA collaboration has two experiments which measure the birefringence of the 22kg sapphire substrates within a duration of weeks. It is planned to increase the mass of the test-masses to the hundred-kg scale making the current birefringence characterization measurements impractical.

Here, we propose to use a pair of identical liquid crystals to measure and compensate birefringence of substrates with arbitrary size. We are now developing such experiment which will decrease the characterization duration by at least a factor of two and possibly down to the second scale while demonstrating for the first time birefringence compensation for gravitational wave detectors.

**Auteurs principaux:** EISENMANN, Marc (National Astronomical Observatory of Japan); Prof. LEONARDI, Matteo (University of Trento, Italy); SINGH, Shalika (National Astronomical Observatory of Japan)

Orateur: SINGH, Shalika (National Astronomical Observatory of Japan)

Classification de Session: Dark and Primordial Universe & Gravitational Waves

Classification de thématique: Gravitational Waves