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**Magneto-Optical Materials for Future Gravitational Wave Detectors**[1] MARIAM MCHEDLIDZE[2], ARIELLA HERNANDEZ[3], RODICA MARTIN[4], Montclair State University — Gravitational waves are novel astronomical tools for observing the dynamic side of the Universe. Unlike light-based telescopes that observe stars and galaxies in electromagnetic waves or light, gravitational-wave detectors such as the Laser Interferometer Gravitational-wave Observatory (LIGO), are 4 km-long Michelson interferometers that use infrared lasers and light interference to sense gravitational waves from merging black holes, or colliding neutron stars. Detected for the first time in September 2015, gravitational waves carry information that cannot be obtained in any other way, helping our understanding of their origins and of the Universe. With more sensitive detectors, we could observe gravitational waves from even further sources. Our research focuses on the development of one key device that contributes to improving the sensitivity of these detectors a Faraday isolator. This device uses a magneto-optical material that helps control the polarization of light when applying an external magnetic field. Improved Faraday isolators require high transparency, effective polarization control, and minimal distortion of the transmitted beam. Cerium Fluoride (CeF3) is one promising magneto-optical candidate, and we will be characterizing its properties in our study.

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