GWADW2023 - Gravitational-Wave Advanced Detector Workshop



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Faraday isolators for future gravitational-wave detectors - Characterization of a commercial isolator at 2052 nm and plans for Voyager.

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Faraday isolators are needed in various areas of the gravitational-wave detectors, either requiring very lowloss (in the squeezer area), or high-power operation (in the input area), all while maintaining excellent optical isolation and low-noise performance.

Ultra-low-loss Faraday isolators have been built for the A+ output and squeezer isolators, and have shown excellent performance during the current commissioning runs. At longer wavelengths however, although commercial isolators are available, low-loss designs are not as mature, and fewer options for high-precision optics and lasers for testing are accessible, and more work is needed to develop suitable isolators.

We would like to present the results of our investigations characterizing a commercially available Faraday isolator at 2052 nm wavelength, status and plans for building a pathfinder for the Voyager, and to invite the discussion for options to consider while moving forward. We will also review the current status of available materials for these isolators in a range of wavelengths 1-2 um, of interest for future gravitational-wave detectors.

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