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Modeling of Optical Resonators Using Gaussian Beams and Ray Tracing Techniques LILIANA RUIZ, SERGIO CANTU, VOLKER QUETSCHKE, MALIK RAKHMANOV, University of Texas at Brownsville — One of the main components in the laser stabilization subsystem in the Laser Interferometer Gravitational-Wave Observatory (LIGO) is a triangular ring resonator, which filters out high order Hermite-Gaussian modes in the laser beam. We developed a model to study the optical properties of such resonators and investigate their performance. The propagation of the laser beam is modeled by combining ray tracing techniques with wave optics. The model can be used to analyze various effects due to mirror misalignments and fluctuations of the laser beam pointing.

> Liliana Ruiz University of Texas at Brownsville

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