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Modeling and fabrication of Ridge Waveguides and their comparison to Photonic Bandgap Structures KATHLEEN BEDDOW, MERON TEKESTE, SENTHIL RAJAGOPAL, JAN YARRISON-RICE, Miami University — Through the implementation of a computer modeling program, the properties of ridge waveguides composed of a 200nm layer of silicon nitride (Si_3N_4) on 1.8 μm of silicon dioxide (SiO_2) were explored. The Si_3N_4 was altered from its initial 200 nm thickness in order to create a central ridge. The width and thickness of this ridge were varied in an effort to investigate the propagation of a single mode Gaussian beam of 632.8nm wavelength along both straight and curved ridge waveguides. The fabrication of these waveguides will be accomplished through the implementation of optical lithography, the exposure of the substrate, coated with either a positive or negative photoresist, with UV light. The investigation of Photonic Bandgap (PBG) structures was also done through the use of modeling software. A photonic lattice was created as a result of the etching of the substrate Si_3N_4 with a periodic array of air pores. Subsequently, a waveguide was produced through the removal of a series of these air pores. The modeling of PBG structures allowed for comparisons to be made between the photonic properties of the ridge waveguides and the PBG structures.

Kathleen Beddow
Miami University

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