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Photonic Devices in Chalcogenide Glass Films

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Chalcogenide glasses are attractive for photonic applications having high index allowing the fabrication of high index contrast waveguides and photonic crystals; moderate Verdet constants opening up the possibility of magneto-optic devices; and high optical nonlinearity for all-optical processing. I will describe our work to develop both conventional waveguide devices via reactive ion etching and photonic crystal using a focused ion beam mill. The dry etching approach provides optical waveguides with losses as low as 0.1dB/cm and have been used to demonstrate all-optical devices such as a compact all-optical regenerator utilizing high performance Bragg reflectors. Photonic crystals directly milled into AMTIR-1 films supported on silicon nitride membranes show high optical quality suitable all-optical switching using fano resonance phenomena. Whilst these results are very encouraging many difficulties remain. In particular obtaining chalcogenide glass films with good long term stability remains a challenge and photo-structural changes are observed at wavelengths well beyond the band edge are observed at high intensities.

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4:00 PM - Hunter Auditorium – Room 100