Graduate Course

ECE 6530
MODULATION, DIFFRACTIVE, AND CRYSTAL OPTICS

The objective of this course is to provide a working knowledge of temporal and spatial optical modulation, diffractive optical devices, and crystal optics.

Text: Class notes.
Instructor: Prof. Tom Gaylord

SUMMARY OUTLINE

• Optics of Birefringent Crystals
• Linear Birefringent Devices
• Circular Birefringent Devices
• Wave Interference
• Electro-Optic Modulation
• Diffractive Optics
• Photonic Crystals
• Metamaterials
• Acousto-Optic Devices

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Results

• Fabricated grating in PMMA resist using direct-write E-beam lithography and overcoated with 60 nm of aluminum

• Simulated resulting profile using PCGrate vector electromagnetic software

• Measured diffraction efficiency (TE+TM) – Vectorial and scalar simulations agree well with experimental results – Wood’s anomalies are seen in both the vector simulation (due to TM polarization) and the measurement

Integrated efficiency under SGG curve is equal to that under sawtooth-blaze curve