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Terahertz transmittance of single-mode photonic crystal slabs[1]
CRISTO YEE, NATHAN JUKAM, MARK SHERWIN, Physics Dept., Univesity of California Santa Barbara — Terahertz (THz) radiation lies in the gap between optical and electronic frequencies. Its importance has grown during the past few years due to applications ranging from security to biomedicine to quantum information processing. These applications often require manipulating electromagnetic radiation on-chip, and THz Photonic Crystals (PC) are a natural solution. Terahertz PCs have two advantage: Silicon has a negligible absorption and the large PC dimensions makes fabrication defects negligible. In this work we report the first measurement of a transmission through a single mode THz PC Slab . The PC slab consist on an triangular array of holes with lattice constant a=64 μm, radius r=0.3a and thickness d=0.74a. The PC slab was fabricated with Reactive Ion Etching on a high-resistivity Si wafer. FTIR transmission spectrum along the J orientation shows an optical bangap from 1.2 to 1.6 THz for the TE mode, in good agreement with our FDTD calculations. The PC slab is the starting point for testing devices like waveguides and cavities.

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