Photonic Band Structure of Channel Glass Materials
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Photonic band structure is a concept describing the propagation of photons (light) in certain engineered materials. In these materials, the refractive index is modulated on a length scale comparable to the wavelength of a photon. The index modulation gives rise to photonic band gaps, i.e. spectral regions where photons cannot propagate. The behavior of photons in these materials is analogous to the behavior of electrons interacting with the atomic potential in a conventional crystal. Therefore, unprecedented control over the flow of photons is envisioned in these materials, analogous to the control of electrons in a semiconductor. Due to the difficulties associated with working at the sub-micron length scales required by optical wavelengths, original attention focused on the mm-wave region. However, in the past couple of years, our group at NRL has fabricated and studied the first materials with two-dimensional band gaps in the visible spectral region. Our photonic band gap materials are based on "channel glass" materials, which consist of regular arrays of sub-micron diameter channels in a glass matrix. Applications such as optical filters, sensors, and optical limiters have also been investigated initially, and efforts aimed at understanding and improving the properties of these novel materials continue.
The public is welcome
Refreshments at 3:45 p.m.
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