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An attempt to intuitively understand intrinsic birefringence ERIC L. SHIRLEY, NIST — In recent years, intrinsic birefringence has grown from being a topic of curiosity to a symmetric-breaking effect on the optical properties of cubic-symmetry materials. In many cubic systems, light propagating along the (1,1,0) direction has different refractive indices for polarization along (0,0,1) versus (1,-1,0). This has been important in consideration of calcium, barium and strontium fluoride as refractive elements in deep- ultraviolet lithography. Largely, the most successful theoretical prediction of the magnitude or even sign of the birefringence relies on first-principles calculations, the results of which are difficult to predict beforehand. This talk presents an attempt to correlate the birefringence with other properties of a material, such as whether a given ion species is surrounded by an octahedral or cubic cage of near-neighbor ions.

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