

Lecture 10

Photonics

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Ten lecture

Acousto optical effect

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Acousto optical effect

Acousto-optic components use a range of different materials in a variety of configurations. These can be described by terms such as isotropic and anisotropic. While these all share the basic principles of momentum and energy conservation, these different modes of operation have very different performances. In general, acousto-optic effects are based on the change of the refractive index of a medium due to the presence of sound waves in that medium. Sound waves produce a refractive index grating in the material, and it is this grating that is "seen" by the light wave. These variations in the refractive index, due to the pressure fluctuations, may be detected optically by refraction, diffraction, and interference effects. Reflection may also be used. The principal area of interest is in acousto-optical devices for the deflection, modulation, signal processing and frequency shifting of light beams. This is due to the increasing availability and performance of lasers, which have made the acousto-optic effect easier to observe and measure. Technical progress in both crystal growth and high frequency piezoelectric transducers has brought valuable benefits to acousto-optic components' improvements..

