

Photoelastic Effect

The diagram shows the equation $\Delta \left(\frac{1}{n^2} \right) = p_e S$ enclosed in a box. An arrow labeled 'Change' points to the Δ symbol. An arrow labeled 'Refractive index' points to the n^2 term. An arrow labeled 'Photoelastic coefficient' points to the p_e term. An arrow labeled 'Strain' points to the S term.

$$\Delta \left(\frac{1}{n^2} \right) = p_e S$$

Change Refractive index Photoelastic coefficient Strain

The strain changes the density of the crystal and distorts the bonds (and hence the electron orbits), which lead to a change in the refractive index n .

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Read Book Acousto-Optic Devices Principles Design Applications Wiley The principle behind the operation of acousto-optic tunable filters is based on the wavelength of the diffracted light being dependent on the acoustic frequency. By tuning the frequency of the acoustic wave, the desired wavelength of the optical wave can be diffracted acousto-optically. Acousto-optics - Wikipedia It also ...

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Acousto-optic devices : principles, design, and ...

The text develops the underlying theory of acousto-optics from first principles, formulating results suitable for subsequent calculations and design. Special attention is given to design procedures for the entire range of acousto-optic devices and various applications of these devices are also described. Further topics include bulk wave and thin film devices, transducer theory and isotropic and birefringent interaction.

Acousto-optic Devices: Principles, Design and Applications ...

This phenomenon, known as the acousto-optic (AO) diffraction, has led to a variety of optical devices that perform spatial, temporal and spectral modulations of light. These devices have been used in optical systems for light-beam control and signal-processing applications.

CHAPTER 12 ACOUSTO-OPTIC DEVICES AND APPLICATIONS

An Acousto-Optic (AO) device is essentially an optical cell with an ultrasonic transducer (generally in the 10s/100s MHz region) bonded to one of its faces. The acoustic beam creates a sinusoidal perturbation of the refractive index of the medium due to the photoelastic effect which acts as a volume diffraction grating.

Acousto-Optic Tunable Filters (AOTFs) Optimised for ...

There are several limitations associated with the design and performance of acousto-optic modulators. The acousto-optic medium must be designed carefully to provide maximum light intensity in a single diffracted beam. The time taken for the acoustic wave to travel across the diameter of the light beam gives a limitation on the switching speed, and hence limits the modulation bandwidth. The finite velocity of the acoustic wave means the light cannot be fully switched on or off ...

Acousto-optics - Wikipedia

• Pays special attention to design procedures for the entire range of acousto-optic devices and various applications of these devices. • Provides research information on modern magneto-optic ...

(PDF) Crystal Optics: Properties and Applications

Acousto-optic light deflection devices are being designed for a wide range of exploratory systems applications such as optical memories [1], information processing [2, 3, 4], and laser displays [5, 6]. The most common means for generating the required ultrasonic beam is by electrically driving a piezoelectric

Acousto-Optic Light Deflection: Design ...

Acousto-optic tunable filters are powerful tools for spectroscopy, imaging, and WDM. Gupta traces the development of these devices and discusses current and future applications. Skip to search form Skip to main content Semantic Scholar. Search. FAQ About Contact • Sign In Create Free Account. You are currently offline. Some features of the site may not work correctly. DOI: 10.1364/OPN.8.11 ...

[PDF] ACOUSTO-OPTIC TUNABLE FILTERS | Semantic Scholar

An acousto-optic modulator consists of a piezoelectric transducer which creates sound waves in a material like glass or quartz. A light beam is diffracted into several orders. By vibrating the material with a pure sinusoid and tilting the AOM so the light is reflected from the flat sound waves into the first diffraction order, up to 90% deflection efficiency can be achieved.

Acousto-optic modulator - Wikipedia

Acousto-optics (AO) devices are widely used for modulation and deflection of laser beam. However, variety of efficient AO materials is not rich and their "laser" properties are not of the first-priority for their initial selection. In particular, their radiation resistance is limited by the intrinsic properties of the crystals.

Acousto-optics Devices for High-power Laser Beam

J. Xu, and R. Stroud, Acousto-Optic Devices, Principles, Design and Applications (John Wiley and Sons Inc., 1992). D. Reddy, and P. Saggau, "Fast Three-Dimensional Random Access Multi-Photon Microscopy for Functional Recording of Neuronal Activity," Proc. SPIE 6630, 66301A 66301A-66308 (2007). Cited By . OSA participates in CrossRef's Cited-By Linking service. Citing articles from OSA ...

OSA | A compact acousto-optic lens for 2D and 3D ...

It contains previously unpublished treatments of acousto-optic device design and impedance matching, permitting the actual design of real devices and device-matching circuits. Table of Contents Principles of acousto-optics; design of acousto-optic

deflectors; design of acoustic-optic modulators; acousto-optic tunable filters; transducer design; acousto-optic device manufacturing; testing of acousto-optic devices.

Design and Fabrication of Acousto-Optic Devices - 1st ...

Chapter 3 develops the underlying theory of acousto-optics from first principles, formulating results suitable for subsequent calculations and design. The fourth chapter describes the basic principles of magneto-optic effects and mode of interaction with magnetic materials. The fifth chapter provides an understanding of the physical phenomenon of the linear and quadratic electro-optic effects in isotropic and crystalline materials. The last chapter collects many of the most important recent ...

Crystal Optics | Wiley Online Books

The text develops the underlying theory of acousto-optics from first principles, formulating results suitable for subsequent calculations and design. Special attention is given to design procedures for the entire range of acousto-optic devices and various applications of these devices are also described. Further topics include bulk wave and thin film devices, transducer theory and isotropic and birefringent interaction.

CiNii [?] - Acousto-optic devices : principles, design, and ...

Innovative acousto-optic device designs stretch minimize undesirable effects of crosstalk, light leakage, and beam distortion. Our Fiber-Q ® line of fiber-coupled acousto-optic modulators received the prestigious Queen's Award for Enterprise: Innovation in 2016 and the Institute of Physics (IOP) Award for Innovation in 2014.

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