

How to use the photoelastic modulator



AI Overview

A photoelastic modulator (PEM) modulates the polarization of light by inducing a time-varying birefringence in an optical element, controlled via a piezoelectric transducer. Understanding the PEM consists of a transparent optical element (commonly fused silica) bonded to a piezoelectric transducer. The transducer vibrates the optical element at its resonant frequency, producing a periodic change in birefringence. This modulation alters the phase difference between orthogonal polarization components of light, known as retardation, which can be used to measure circular or linear dichroism, optical rotation, or birefringence in samples.

Basic Setup

Mount the Optical Head: Secure the PEM optical assembly in the optical path, ensuring the light beam passes through the center of the optical element.

Connect the Controller: Attach the optical head to the PEM controller using the provided cables. The controller supplies the drive voltage to the transducer and allows electronic adjustment of the modulation amplitude.

Align Polarization: Set the incoming light polarization at 45° to the modulator axis. This ensures maximum modulation effect, as the PEM introduces a phase shift between horizontal and vertical components.

Power On and Tune: Turn on the controller and allow the PEM to reach its resonant oscillation. The controller may display the first (1f) and second harmonic (2f) outputs, which can be used for synchronization with detection electronics.

Operating the PEM

Adjust Retardation: Use the controller to set the desired peak retardation. For example, a quarter-wave or half-wave retardation can be selected depending on the measurement type.

Monitor Harmonics: The 1f and 2f TTL outputs provide signals corresponding to the modulation frequency, which can be used to lock detection systems or synchronize with lock-in amplifiers.

Sample Measurement: Place the sample in the modulated light path. The PEM converts changes in the sample's optical properties into measurable intensity variations at th...

Article Content

High speed stress measurement technique based on photoelastic modulator ...

In this work, a high-resolution method for residual stress measurement in silicon wafer based on photoelastic modulator was introduced. Then, to improve the measurement speed of this

Photoelastic Modulators (PEMs): A Comprehensive Overview

This modulation can be used to generate various polarization states, such as linear, circular, or elliptical polarization, and can be controlled by adjusting the amplitude of oscillation.

Principles of PEM Operation

View an Animated Tutorial of PEM Principles of Operation. The phenomenon of photoelasticity is the basis of operation for the PEM.

Longitudinal piezoelectric resonant photoelastic modulator for ...

Here, we report a new type of single frequency intensity modulator that we refer to as a longitudinal piezoelectric resonant photoelastic modulator.

Photoelastic modulators

Quick Overview Pure and Efficient polarization modulation Hinds Instruments is the world's leading developer of technologies based on the principles of polarization

The PEMCSC photoelastic modulator is an instrument used for

The PEMCSC photoelastic modulator is an instrument used for modulating or varying (at a fixed frequency) the polarization of a beam of light.

Photoelastic Modulators

Photoelastic modulators from Hinds Instruments are key components of photonics applications, and are a key piece in a wide range of polarization-based

Overview of Phase Modulation Technology

Overview of Phase Modulation Technology The UVISEL range of HORIBA Jobin Yvon spectroscopic ellipsometers use photoelastic modulators to perform polarization modulation at a high frequency (50

PEM-CSC PHOTOELASTIC MODULATOR

The PEM CSC Photoelastic Modulator is an instrument used for modulating or varying (at a fixed frequency) the polarization of a beam of light. Hinds photoelastic modulators are used for

HINDS INSTRUMENTS PEM-CSC USER MANUAL Pdf Download

Introduction Overview The PEM CSC Photoelastic Modulator is an instrument used for modulating or varying (at a fixed frequency) the polarization of a beam of light.

Overview of Phase Modulation Technology

Both polarizers are held fixed during the measurement while the photoelastic modulator is used to induce a modulated phase shift of the reflected beam. The light is analyzed by a grating

Photoelastic modulator explained

A photoelastic modulator (PEM) is an optical device used to modulate the polarization of a light source. The photoelastic effect is used to change the birefringence of the optical element in the photoelastic

PEM Technical Overview rev2 web

The PEM200 photoelastic modulator is an instrument used for modulating or varying (at a fixed frequency) the polarization of a beam of light. The basic PEM system includes the PEM-200

Photoelastic light modulators – advanced products by

Photoelastic light modulators Photoelastic modulators (PEMs) are a key component across a diverse range of photonic applications. Our portfolio of Photoelastic

Physics:Photoelastic modulator

A photoelastic modulator (PEM) is an optical device used to modulate the polarization of a light source. The photoelastic effect is used to change the birefringence of the optical element in the photoelastic

Imaging with photoelastic modulators

Photoelastic modulators (PEMs) are among the most robust and precise polarization modulation devices, but the high frequency free-running nature of PEMs challenges their

Photoelastic Modulation

This technology section describes the principles of operation, and modes and unique features of our photoelastic modulators. The Principles of Operation section describes the effects of compression

Photoelastic Modulators (PEMs)

Photoelastic modulators (PEMs) are key components in a diverse range of photonics applications. Hinds Instruments are the world leader based on the

Photoelastic Modulator

The output polarization is shown in the following figure. In the photoelastic modulator AC-voltage is applied to piezo-oscillator is Figure 1: The output of the electric field by photoelastic modulator. $x =$

Photoelastic Modulators (PEMs)

What is a Photoelastic Modulator (PEM) and how does it work? A Photoelastic Modulator (PEM) is an optical device that modulates the polarisation of light to gain information about mechanical stresses

Light Intensity Modulation Using a PEM

The photoelastic modulator (PEM) modulates light polarization.¹⁻³ The operating principle of a PEM manifests the photoelastic effect, in which a mechanically stressed sample exhibits optical

Photoelastic Modulators

Photoelastic modulator is applied for changing the polarization state of light, and make the transmitted light have a dynamic phase retardation. The light-passing part of the device is made of isotropic

Contact Us

For more information, pricing, or custom solutions, please contact us:

Website: <https://www.mr-security.co.za>

Email: info@mr-security.co.za

Phone: +33 1 45 23 67 81

Address: 10 Rue de la Paix, 75002 Paris, France

This document is for informational purposes only. Specifications subject to change without notice.

