# Function of a grating beam splitter

## Article Overview

A grating in a beam splitter is a diffraction grating that splits an incident light beam into multiple beams at specific angles based on wavelength and grating spacing.

What a Grating Does

In a grating beam splitter, the grating is the core optical element. It consists of a series of equally spaced, parallel lines or grooves that form a periodic structure on the surface of the device . When a light beam strikes this grating, the periodic structure causes the light to diffract, producing multiple beams that travel in different directions. These beams correspond to different diffraction orders, with the zeroth order being the undeviated beam and higher orders deviating at angles determined by the grating spacing and the wavelength of the light .

How It Works

The diffraction process follows the grating equation, which relates the incident angle, diffracted angle, wavelength, and groove spacing. Constructive interference occurs at specific angles, allowing the grating to split the light efficiently into desired directions . Unlike conventional beam splitters that rely on partial reflection and transmission, a grating beam splitter uses diffraction to control the direction and intensity of the output beams .

Applications

Grating beam splitters are widely used in spectrometers, interferometers, and imag...

## Article Content

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All About Diffraction Gratings

Learn about how diffraction gratings separate incident light into separate beam paths, different types of gratings, and how to choose

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Transmission Grating Beamsplitters

Transmission Grating Beamsplitters used for laser beam division and multiple laser line separation in visible wavelengths are

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Dual-function beam splitter of high contrast gratings

We present the design and fabrication of a novel dual-function high contrast gratings (HCGs) that can be used as a

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2D Diffractive Beam Splitter Grating

2D Diffractive Beam Splitter Grating Description Product features: Plane matrix segment beam splitting,

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What are Beamsplitters?

Optical components that create two beams by splitting incident light are beamsplitters. Read more about the different types of

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Diffractive beam splitter

A diffractive beam splitter can generate either a 1-dimensional beam array (1xN) or a 2-dimensional beam matrix (MxN), depending

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Dual-functional grating splitter with high efficiency at the second ...

In this paper, a novel dual-functional grating beam splitter is presented, designed to exhibit unique diffraction

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Design and Implementation of Ultra-Compact Grating-Based 2Ã 2 Beam ...

We provide detailed experimental study of reflectivity, insertion loss, and interference extinction ratio for our recently

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grating beamsplitter | Photonics Dictionary | Photonics Marketplace

Beam splitting function: In the context of a grating beamsplitter, one or more of the diffraction orders may be selectively used for

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Dual-function beam splitter of high contrast gratings

This dual-function grating profile is optimized by the rigorous coupled-wave analysis and the finite-element method. Simple analytical

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grating beamsplitter | Photonics Dictionary | Photonics Marketplace

A grating beamsplitter is an optical device that utilizes the principles of diffraction to split a beam of light into multiple beams, often

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What is Diffraction Grating? Advantages & Applications

Learn about diffraction grating, its working principle, advantages, and applications in spectroscopy, lasers, and optical systems.

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Polarization beam splitter based on a double-groove slanted grating ...

In this paper, we propose a one-dimensional polarization beam splitting grating under normal incidence with excellent

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How Do Optical Beam Splitters Work & Applications

Diffractive beam splitters, or Damman gratings, are thin window like components that split a laser beam into an array of

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Beam Splitters – optical power splitter, beamsplitter, thin-film ...

What are Beam Splitters? A beam splitter (or beamsplitter, power splitter) is an optical device which can split an incident light beam

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Schematic illustration of a dual-function beam splitter grating. The ...

We present the design and fabrication of a novel dual-function subwavelength fused-silica grating that can be used as a polarization

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Diffractive Multispot Beam splitter

INTRODUCTION A diffractive Beam Splitter, or Multispot (MS), is a grating-like periodic diffractive optical element (DOE) used to

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Gratings: amplitude, phase, sinusoidal, binary

Example: binary phase grating q=+5 q=+4 q=+3 glass q=+2 q=+1 q=0 q= –1 q= –2 q= –3 q= –4 q= –5

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What are Beamsplitters?

Beamsplitters are optical components used to split incident light at a designated ratio into two separate beams. Additionally,

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Beam Splitter

A beam splitter is defined as an optical device that effects a linear transformation of fields presented at two input ports, producing

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Two-output beam splitter with continuously adjustable splitting ratio ...

In this paper, a new type of diffractive optical beam splitter, which is based on phase grating, is fabricated with binary

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Dual-functional grating splitter with high efficiency at the second ...

Dual-functional grating beam splitter at the second Bragg incidence angle Figure 1(a) presents a three-dimensional illustration of the

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Types of Diffraction Gratings and What They Are Used For

This article provides a summary of the types of diffraction gratings, their applications, and an explanation of the

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A variable multi-beam splitter based on a unified dual-layer meta-grating

Beam splitters are essential in optical communication but are typically limited to invariable functions. This paper

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Diffraction Gratings Tutorial

Diffraction gratings, either transmissive or reflective, can separate different wavelengths of light using a repetitive structure

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Double-structure, bidirectional and polarization-independent ...

In this paper, we theoretically investigated polarization-independent subwavelength binary blazed grating beam

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How diffraction gratings work | Description, Example & Application

The diffraction grating can be used as a beam splitter, directing the laser beam to multiple destinations. They are also

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Grating beam splitting with liquid crystal adaptive optics

Light addressing and splitting are among the most used functions of diffractive optical elements (DOEs). Over the

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Trapezoidal dual-function splitter under second Bragg incidence

In this paper, a reflective trapezoidal dual-functional beam splitter grating is proposed, which performs two independent

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Deep-etched high-spatial-frequency metal-based sandwiched grating

To our knowledge, no one has proposed a reflective dual-function beam splitter grating based on a deep-etched metal

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A Review: Laser Interference Lithography for Diffraction Gratings and ...

The unique diffractive properties of gratings have made them essential in a wide range of applications, including

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Diffraction-grating beam splitter, interferometric-lithography ...

Interferometric lithography (IL) with a partially reflective beam splitter or with Lloyd''s mirror is limited in the area by the

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Newly reflective bi-function beam splitter by SiO

An enhanced newly high-efficiency dual-function beam splitter of the grating is described in this paper. The proposed

Oct 07, 2025

Trapezoidal dual-function splitter under second Bragg incidence

Under TE polarization, the grating functions as 1 × 3 beam splitters with 32.85% efficiency for 0th order, 32.89% for -1st

Mar 01, 2026

The Mathematical Theory of Laser Beam-Splitting Gratings

Beam splitting gratings are used to split a laser beam into multiple beams for industrial and scientific applications, while diffraction

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Beam splitter

A beam splitter or beamsplitter is an optical device that splits a beam of light into a transmitted and a

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