

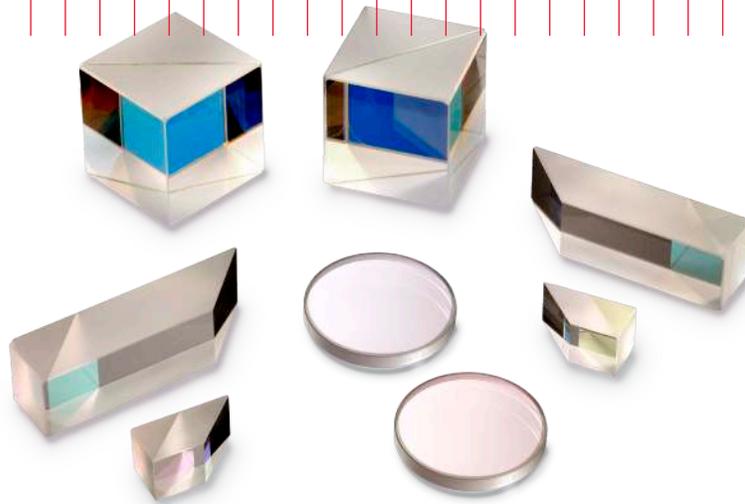
Keysight Technologies

Beamsplitter Family

Precision beam control for demanding Optical applications

Technical Overview

- Parallel or orthogonal output beams
- Near-distortionless beam splitting
- Multiple geometries
- Standard and custom products available



Keysight beamsplitter family

Overview

The Keysight Technology, Inc. family of high-performance beamsplitters offers industry-leading polarization and beam control with low wavefront distortion. For more than 35 years, Keysight has designed and produced beamsplitters exclusively for the most demanding custom interferometry applications. Today, optics produced using these high-precision design and manufacturing techniques are available in a variety of standard and custom products.

Keysight's family of precision beamsplitters split light by polarization, amplitude, or wavelength. They are available in cube, plate, and displacement geometries. In both standard and custom models, Keysight beamsplitters deliver a high-level of performance and consistency that optical designers can count on. They offer a range of choices to meet current and emerging applications in aerospace and defense, homeland security, biotechnology, scientific instrumentation, and nanotechnology measurement.

Flexibility

Keysight's beamsplitter product family is designed with the flexibility to meet unique system requirements. Keysight's standard beamsplitters separate an input beam into two or more output beams based on polarization, amplitude, or wavelength. Standard products are available at laser wavelengths from 193 to 1550 nm. For applications requiring orthogonal output beams, Keysight offers cube and plate geometries. For applications requiring a precise parallel or lateral displacement of output beams, Keysight's standard displacement beamsplitters are available with arcsecond accuracy. Custom beamsplitters are also available for applications requiring non-standard wavelengths or geometries.

Proven reliability

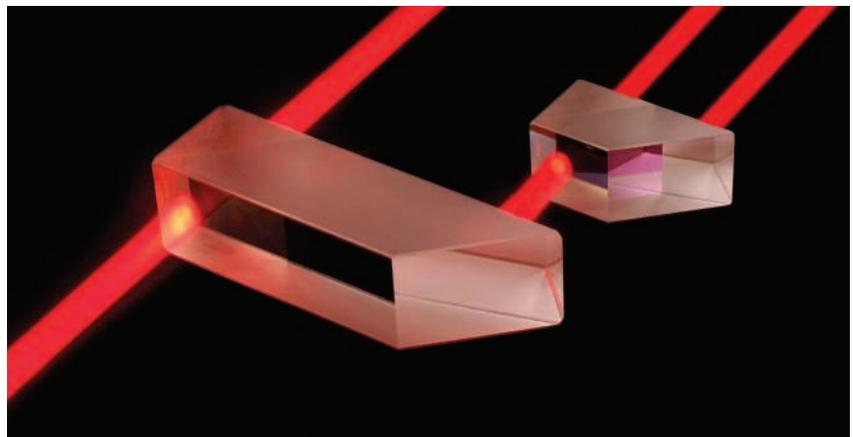
More than 10,000 Keysight optical assemblies have shipped, attesting to our ability to design, fabricate, and deliver high-quality optical products and assemblies. Keysight optics are used by leading semiconductor equipment, aerospace and defense, and test and measurement companies for precise beam control.

Applications

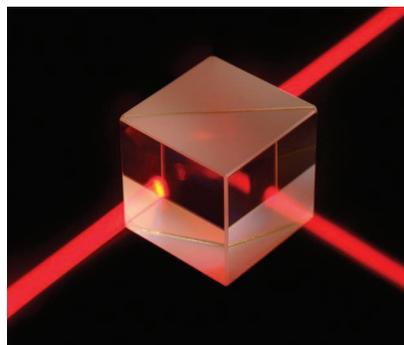
- Distance interferometry
- Polarization recovery
- Beam steering

Key benefits

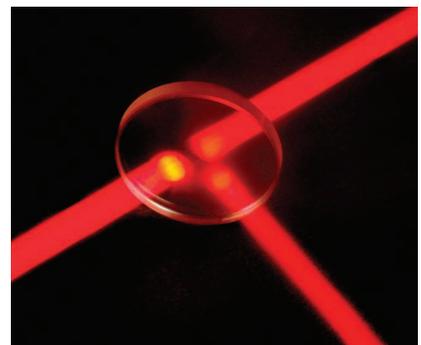
- Convenient splitter geometries
- Large clear aperture
- Precise beam positioning



Keysight's displacement beamsplitters accurately split an input beam into two or more output beams with arcsecond parallelism.



Cube beamsplitters are designed to separate an input beam into two beams accurately exiting at a 90° angle to each other.



Keysight's plate beamsplitters offer compact size and thermal mass with lower wavefront distortion; arcsecond wedge tolerance ensures a precise 90° separation between the output beams.

Polarizing beamsplitters

Keysight's polarization beamsplitters are designed to transmit p-polarized light, and reflect or displace s-polarized light. Standard and custom configurations are available for optical instrumentation, laser interferometry, and biomedical applications. Geometries that separate the output beams by 90° (cube beamsplitters) are available, as are geometries that displace the output beams, which remain parallel (displacement beamsplitters); other geometries are available on a custom basis.

Polarizing cube beamsplitters

Keysight's standard polarization beam splitting cubes separate the orthogonally-polarized output beams by 90° with an accuracy of five arcminutes; custom models are available with arcsecond accuracy. Keysight's

proprietary bonding and coating procedures ensure each output has a very high contrast (1,000:1) and low transmitted wavefront distortion (TWD) of $\lambda/8$.

Polarizing displacement beamsplitters

Where applications require parallel output beams, Keysight's standard displacement beamsplitters provide the same industry-leading contrast ratio and TWD in a compact optic that displaces the beam with 25 arcsecond parallelism. Keysight's BK7 displacement beamsplitters offer the functionality of crystal beam displacers and are more durable, withstanding scratches and stains. In addition, Keysight's displacement beamsplitters are more compact, as the size is not a function of the beam separation.

As a result, Keysight's standard beamsplitters are offered with the small separations enabled by crystal beam displacers, or large separations that are impractical with the traditional materials.

Applications

- Available with parallel or orthogonally propagating output beams
- 1,000:1 contrast in both output beams
- $\lambda/8$ TWD in both output beams
- arcsecond beam parallelism

Benefits

- Compact size
- Near-distortionless output
- Accurate output beam placement
- Symmetrical performance

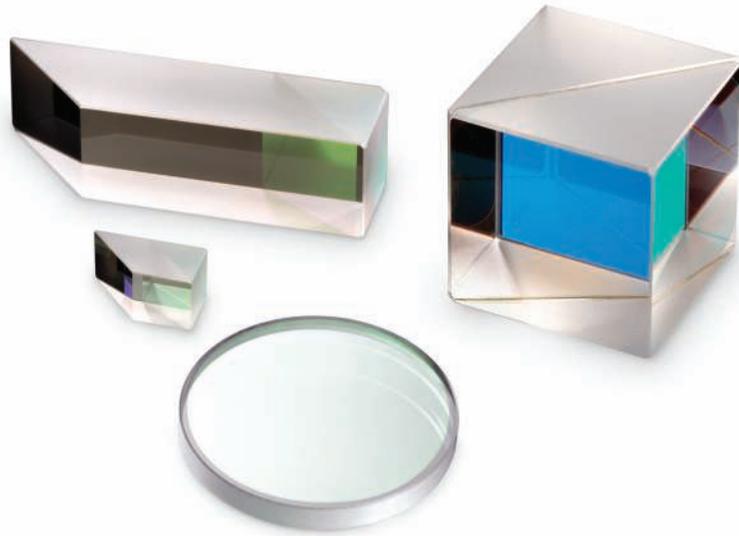
Call for standard and custom product availability



Standard non-polarizing beamsplitters are available in displacement, cube and plate configurations; custom geometries are available upon request

Non-polarizing beamsplitters

Keysight's standard non-polarizing beamsplitter configurations separate the input beam into two output beams; custom configurations can split the input beam into three or more output beams. Non-polarizing beamsplitters are used in a variety of applications in optical instrumentation to distribute fractions of an input beam to other optical sub-assemblies. Standard 50/50 beamsplitters are available in cube, plate, and displacement configurations. Custom beamsplitters are available with the specific split ratios that your application requires.



Standard non-polarizing beamsplitters are available in displacement, cube and plate configurations; custom geometries are available upon request

Non-polarizing cube beamsplitters

Keysight's non-polarizing beamsplitter cubes accurately separate the output beams by 90°, while Keysight's proprietary coating processes ensure that each output beam maintains the polarization of the input beam and maintains a low wavefront distortion of $\lambda/8$.

Applications

- Available with parallel or orthogonally propagating output beams
- Accurate polarization preservation in output beams
- $\lambda/8$ to $\lambda/10$ TWD in both beams
- 50/50, 33/66, and other split ratios available

Benefits

- Compact size
- Accurate output beam placement
- Near-distortionless output
- Symmetrical performance

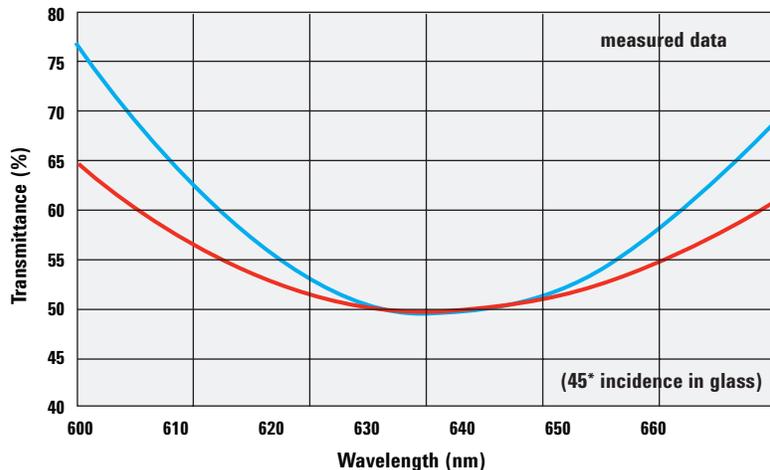
Non-polarizing plate beamsplitters

Keysight's Standard plate beamsplitters also separate the output beams by 90° and offer a $\lambda/10$ wavefront distortion.

Non-polarizing displacement beamsplitters

Where applications require the output beams to be parallel, Keysight's standard displacement beamsplitters offer industry-leading parallelism, accurate to 25 arcseconds.

Immersed non-polarizing 50/50 beamsplitter



Non-polarizing cube beamsplitter at 633 nm

Dichroic Filters and Mirrors

Keysight's chromatic beamsplitters separate the input light into two output beams. Standard products are available as plate beamsplitters and transmit a narrow wavelength band (bandpass filters); custom beamsplitters are available that reflect a specific bandwidth (notch filters), or transmit all wavelengths above a specific center wavelength (long-wave pass) or below a specific center wavelength (short-wave pass), while reflecting the rest.



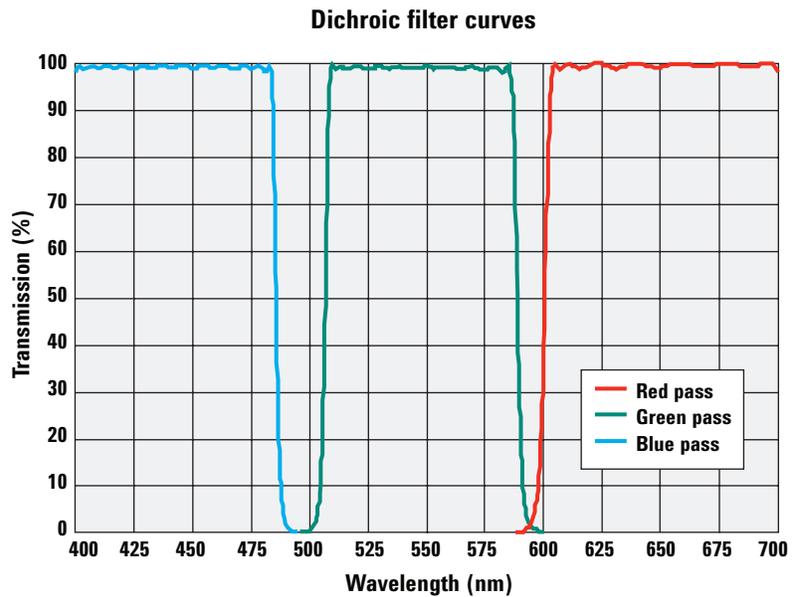
Features

- High pass-band transmission/Low stop-band transmission
- Sharp spectral transitions
- Environmentally robust
- Thin substrate for minimal beam displacement
- Arcsecond wedge
- $\lambda/10$ TWD in both output beams

Benefits

- Convenient size for integration in standard mechanical mounts
- Near-distortionless output

Standard chromatic plate beamsplitters are sized to fit standard mechanical mounts. Arcsecond tolerance on the wedge ensures accurate output beam separation.



Sample low-pass filter, band-pass filter, and high-pass filter transmission curves for RGB separation

Call for standard and custom product availability

Experience you can count on

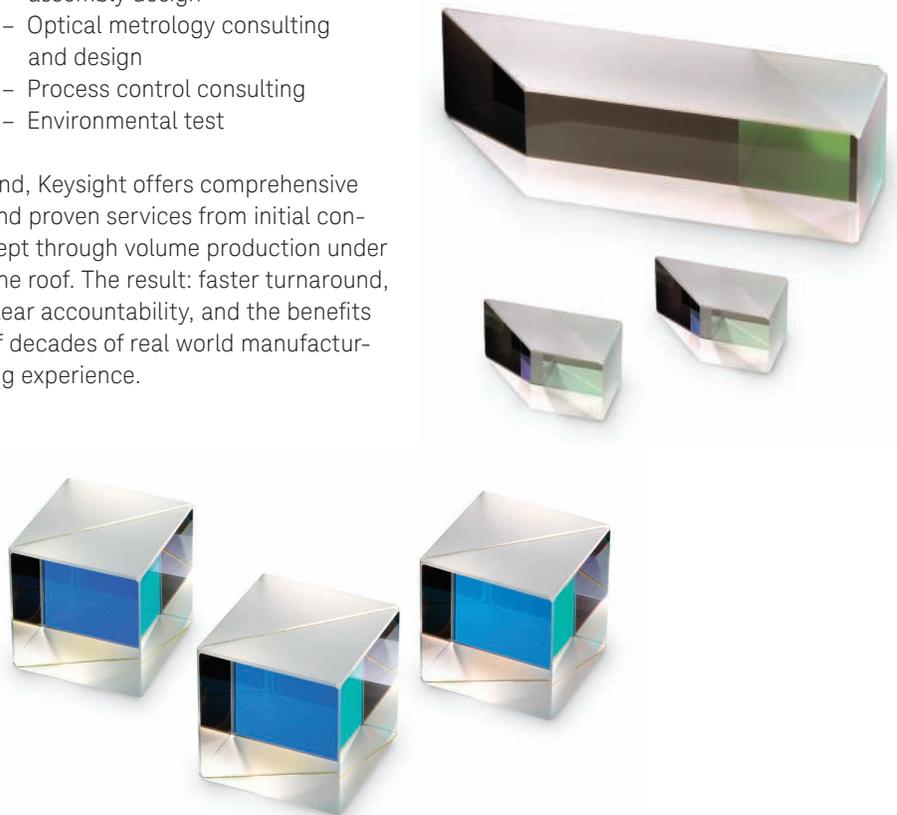
For over 35 years, Keysight Precision Optics has developed and manufactured optical components, monolithic assemblies, and complex optomechanical assemblies for market-leading laser interferometry systems. Combining experienced craftsmanship with deterministic manufacturing process control for volume production, Keysight now serves aerospace and defense and commercial markets with cutting-edge metrology and world-class design, fabrication and thin film coatings in a vertically integrated factory.

Keysight's staff of optical engineers is ready to apply their many years of leading-edge optical design experience to your project. Whether it's a coating design to exacting specifications, the design of a new optic, consultation on an optical fabrication question, or help with a metrology or process control problem, we can provide specific state-of-the-art expertise to rapidly and efficiently solve your problem.

Services available

- Optical design
- Thin-film coating design
- Optical fabrication consulting
- Monolithic opto-mechanical assembly design
- Optical metrology consulting and design
- Process control consulting
- Environmental test

And, Keysight offers comprehensive and proven services from initial concept through volume production under one roof. The result: faster turnaround, clear accountability, and the benefits of decades of real world manufacturing experience.



Coating technologies

Evaporation and Sputtering are examples of Physical Vapor Deposition (PVD) coating technologies. In PVD, the thin film materials are converted to a vapor state through energy transfer (in evaporation) or momentum transfer (in sputtering) prior to condensing on the substrates.

Evaporated coatings enable deposition of low-stress coatings, and are ideal where wavefront is a primary design goal.

Sputtered coatings have higher packing densities enabling a more spectrally stable performance in a variety of operational environments and where spectral accuracy is a primary design goal.

Keysight Precision Optics' engineers utilize both evaporation and sputtering chambers to design coatings that best meet the customer's needs and requirements.

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