

Multimode fiber speckle suppressor



Overview

We present a technique that utilizes cascaded resonant cylindrical piezoelectric ceramics and multimode optical fibers wound around them to effectively mitigate laser speckle. By precisely driving the ceramics at their resonant frequencies and inducing comprehensive mode scrambling within the. The MMSP removes speckle patterns from multimode fiber, addressing issues in applications requiring uniform, stable light output. This multimode scrambler effectively randomizes speckle patterns at a high frequency (>150 kHz), producing a uniform and stationary light distribution for cameras or. The invention relates to a multi-mode optical fiber laser speckle suppression device, comprising an optical fiber clamping part, a vibration generating part and a connecting rod; the optical fiber clamping part is used for clamping the multi-mode optical fiber; the vibration generating part is.



Article Content

Laser speckle suppression by the phase modulation of

When a multimode fiber transmits a laser beam, the speckle will form in its output field. A dynamic fiber scrambler could be used to suppress the

Flexible and lightweight speckle noise suppression module based on ...

High-quality low-speckle projection image in a laser projector is demonstrated. We propose a flexible and lightweight laser speckle noise suppression module based on the combination

Speckle Analysis in Multimode Optical Fibers for Chemical and

We examine how these algorithms perform when analyzing speckle patterns from a polymer optical fiber exposed to variations in both refractive index and pressure.

(PDF) Laser speckle reduction by multimode optical

Abstract and Figures We report significant speckle reduction in a laser illumination system using a vibrating multimode optical fiber bundle.

Record-High Efficiency Speckle Suppression in

We present a technique that utilizes cascaded resonant cylindrical piezoelectric ceramics and multimode optical fibers wound around them to

Investigation on Speckle-Free Imaging at the Output of

Speckle-free imaging using a multimode fiber has been widely used for imaging systems. Generally, previous work has assumed that all the

Mitigating stimulated Brillouin scattering in multimode fibers with ...

Here we propose and demonstrate an efficient method of suppressing SBS in standard multimode fibers while maintaining narrow linewidth and high output-beam quality, via wavefront

Speckle Reduction by Optimized Multimode Fiber Combined With

In this paper, a de-speckle system consisting of a multimode fiber (MMF), a dielectric elastomer actuator (DEA) and a lightpipe is proposed and demonstrated, which can reduce speckle

Flexible and lightweight speckle noise suppression module based on ...

Abstract We propose a flexible and lightweight laser speckle noise suppression module based on the combination of a multimode fiber (MMF) and a macro fiber composite (MFC).

Speckle reduction in OCT with multimode source fiber

When the multimode fiber is placed in the source path of a Michelson interferometer, each spatial mode produces an intensity image of an independent speckle field. To illustrate speckle averaging using

Dynamic speckle generation tuned by thermo-optic effects

We characterized the temporal fluctuations of dynamic speckles in a dedicated optical fiber-based setup, in transmission, where we placed the thermo-optic colloidal suspension between

Investigation of speckle suppression beyond human eye sensitivity by ...

Speckle noise is a major limitation of laser projection and imaging systems, and be suppressed using multimode fiber (MMF); however, speckle suppression is not sufficient when only

Laser Speckle Suppression by the Phase Modulation of

Laser Speckle Suppression by the Phase Modulation of Input Beam in a Multimode Fiber Cong Yang*^{1,2,3}, Jian Han^{1,2}, Yuanjie Wu^{1,2,3}, Huiqi Ye^{1,2}, Dong Xiao^{1,2}

Speckle Reduction by Optimized Multimode Fiber Combined

Static laser speckle suppression using multimode fibers has practical limitations as the technique requires an extremely long fiber to achieve an acceptable speckle contrast.

Theoretical and experimental investigations on speckle suppression of ...

The multimode fiber (MMF) can be adopted to the fiber-coupling laser transmitting optics system of the array-imaging LiDAR for far-range detection due to the relatively high demand for laser

Datasheet

Ideal for DNA sequencing, multimode fiber sensing, and testing of multimode fiber devices, the MMSP is a plug-and-play benchtop unit with a default-enabled TTL input and a 24 V power supply included.

Multimode optical fiber based spectrometers

The fiber-based spectrometer consists of a multimode fiber and a monochrome CCD camera that images the speckle pattern at the end of the fiber. The speckle pattern, created by interference

Record-High Efficiency Speckle Suppression in Multimode Fibers

We present a technique that utilizes cascaded resonant cylindrical piezoelectric ceramics and multimode optical fibers wound around them to effectively mitigate laser speckle. By precisely

Theory of speckle suppression in a laser projector based on a long ...

We analyzed the speckle suppression efficiency of a multimode fiber in a practical laser projector, and developed a theoretical model. Theoretical ana

Information distribution on regions of speckle patterns for imaging of ...

Abstract Multimode fibers (MMF) have been extensively investigated for transmitting images. The transmitting images are distorted into speckle patterns by MMFs, which can be

A multimode fiber laser speckle suppression device

The invention relates to a multi-mode optical fiber laser speckle suppression device, comprising an optical fiber clamping part, a vibration generating part and a connecting rod; the optical fiber

A multimode fiber laser speckle suppression device

In the field of laser display, light transmitted through multimode fibers is projected onto a screen, and multimode fiber speckles cause dynamic spots to appear on the screen, so that the...

The Optimization of Multimode Fiber Speckle Sensor for

Fiber specklegram sensors (FSS) are a kind of sensor based on the intermodal interference of multimode optical fibers (MMFs) . When coherent light is incident into a multimode

Spatial dimension expansion of incoherent optical field

Speckle noise is a major limitation of laser projection and imaging systems, and be suppressed using multimode fiber (MMF); however, speckle

Deep learning and superoscillatory speckles empowered multimode

This work introduces an in-situ nano-displacement measurement system via a multimode fiber probe with superoscillatory speckles and deep learning.

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

Website: <https://www.kwsaevents.co.za>

Email: sales@kwsaevents.co.za

Phone: +27 21 852 4719

Address: 25 Riebeek Street, Cape Town, 8001, South Africa

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