Applied Physics and Photonics (TONA)

Low Speckle Laser Line Generator

Researchers from the Department of Applied Physics and Photonics at the Vrije Universiteit Brussel (Brussels, Belgium) have found a way to strongly decrease the disturbing granularity (speckle) which appears in the images of projected laser lines. The results could lead to an improvement of laser line generators used in the automotive and aeronautical industry.

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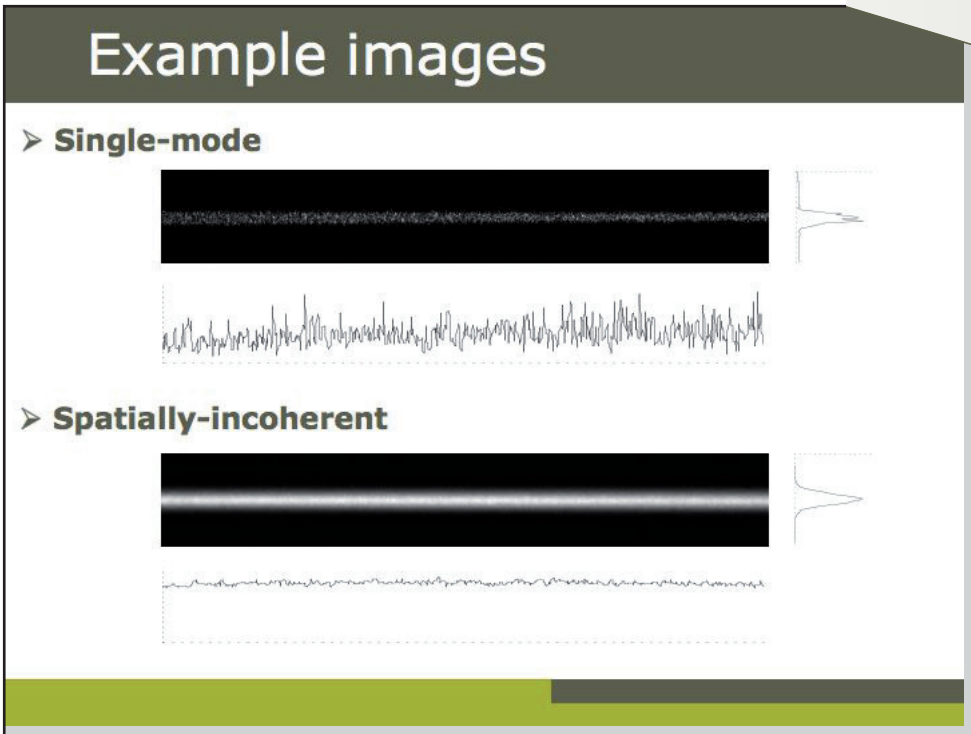

Technology Transfer Offer
Vrije Universiteit Brussel

Technology Description / Special Features

Researchers from the Department of Applied Physics and Photonics at the Vrije Universiteit Brussel (Brussels, Belgium) have found a way to strongly decrease the disturbing granularity (speckle) which appears in the images of projected laser lines. The results could lead to an improvement of laser line generators used in the automotive and aeronautical industry.

Speckle is a disturbing interference phenomenon that occurs when an object is illuminated by a coherent light source, such as a laser. When a laser is used as a light source to generate a light line, speckle expresses itself as a visible granularity in the image. This granularity acts as noise that affects the accuracy of optical measuring devices. We have developed a method for semiconductor lasers which eliminates this undesired effect by driving the laser into a regime of spatially incoherent emission.

Innovation Strengths / Competitive Advantage

Using this technique we have been able to suppress the speckle down to an impressive 4 percent at a wavelength of 850nm. Our setup is very practical since no additional moving or rotating optical components are required.

The numerical aperture and resolution of the detection system in our setup were chosen such that the speckle is fully developed, i.e. the speckle measured with a single mode laser reaches its expected value of 71 percent. Our method of driving the laser into a regime of spatially incoherent emission reduces the speckle contrast with a factor of 18 compared to the single mode emitter. This improvement is equivalent to the speckle reduction that can theoretically be obtained when using 320 independent emitters. However, we achieve low speckle using only 1 laser diode with an output power of 50mW at an emission wavelength of 850nm. Furthermore, the generated laser line has a flat-top intensity distribution along the length of the line, while the intensity distribution is Gaussian in the transverse direction.

Market Opportunities / Industrial Target Group

A uniform laser line with low speckle can be used to greatly improve the resolution of existing CMMs (Coordinate Measurement Machines). These machines are extensively used to measure the shape of mechanical objects in e.g. the automotive and aeronautical industry.

IP Status

Our method to drive a semiconductor laser into a regime of spatially incoherent emission is described in the patent PCT/BE2005/000004 "Broad-area microlasers and methods for driving them".

Collaboration Details

For the further commercialization and use of our technology we are currently looking for a licensing partner interested in this technology.

Inventors

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Keywords

Line generator, reduced speckle