

# PRESS RELEASE

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28.th September 2019 ||

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## Photonics West 2019: Fraunhofer IOF presents new technologies for earth observation

**The Photonics West in San Francisco is considered as one of the leading international fairs in optical technologies and is at the same time a global get-together for science and economy. Among the about 40 Thuringian exhibitors who will present their bundled optical know-how at the joint German booth in Moscone Center is the Fraunhofer Institute for Applied Optics and Precision Engineering IOF from Jena. One of this year's trends are optical technologies for earth observation.**

In early February, the global optics and photonics community will once again convene in San Francisco for the Photonics West. With over 5,000 talks, more than 1,300 exhibitors and 20,000 visitors, the congress is the biggest get-together for the photonics industry. Alongside quantum technologies, this year's highlight topics include developments in the field of additive manufacturing or bonding technologies used in earth observations. The Fraunhofer Institute for Applied Optics and Precision Engineering IOF contributes to these trends with a multitude of new solutions for research and industry.

### Ultra-precise surface treatment using lithography

Integrating several optical functions into one element allows for smaller dimensions of optical high performance systems. An example are imaging spectrometers of the Offner type, which use a reflective grid structure on a spherical surface. An ultra-precisely treated surface was structured through direct-writing lithography, followed by an etching transfer using a reactive plasma process. To present this technology, Fraunhofer IOF shows a spectrometer that became part of the DESIS space mission. Mounted on the ISS, it provides informations about the current state of land and water areas since last summer.

### Bonding technology without interlayers or adhesives

Spectroscopic systems face immense requirements. For the first time, experts of the Fraunhofer Institute for Applied Optics and Precision Engineering in Jena are able to connect compact prism-grating-prism systems by means of direct bonding without adhesives. Since this technology is particularly useful for precision optics in vacuum, it

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**Editorial Notes**

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has been tested for space applications, but can also be used for other vacuum applications like precision optics or highly sensitive interferometers.

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**Lasers for quantum technologies**

Researchers at Fraunhofer IOF have developed a stable, space-capable source for entangled photon pairs. In the future, photons that are connected or »entangled« can be used for safe encryption technologies. Core of this research are refined laser technologies that produce and measure quantum mechanical properties of photons or atoms. As part of a new generation of space-based laser systems, they will enable faster and safer communication between satellites as well as between satellites and ground stations.

The topic of high power fiber lasers will be represented through talks and paper-presentations by colleagues from Fraunhofer IOF and the Institute of Applied Physics (FSU Jena). All interested visitors are invited:

**Session 9: Coherent Combination of Fiber Lasers**

Room 205 (South Level Two)

*3.5 kW coherently combined ultrafast fiber laser*

Wednesday, February 6, 2019 · 10:30 to 11:00

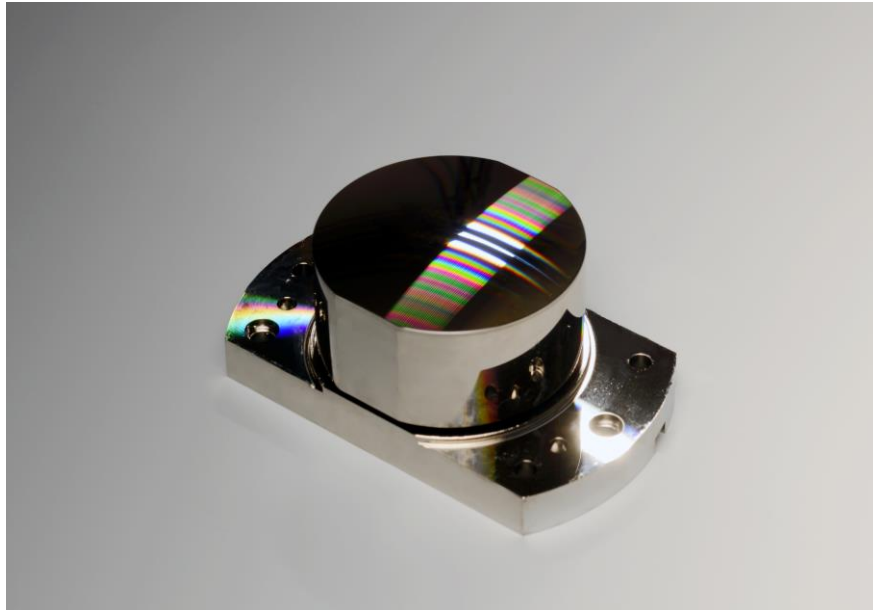
<https://spie.org/PWL/conferencedetails/fiber-lasers#2509693>*Coherent beam combination of pulses emitted by a 16-core ytterbium-doped fiber*

Wednesday, February 6, 2019 · 11:00 to 11:30

<https://spie.org/PWL/conferencedetails/fiber-lasers#2509693>

For further information, the experts from Jena will be available at the Fraunhofer IOF stand at Photonics West (booth Nr. 4545-27, Moscone Center North Hall, German Pavilion) from **February 5-7th**, 2019.

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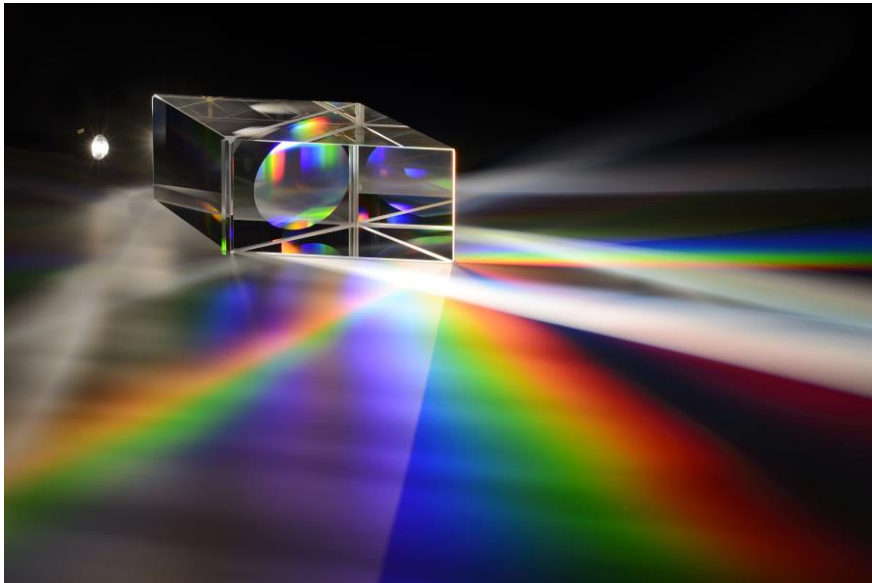
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Fig. 1: Convex-curved lithographically produced grid substrate for the DESIS-mission.  
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Fig. 2: PGP (prism-grating-prism) component for use in imaging spectrometers for earth-observation. © Fraunhofer IOF

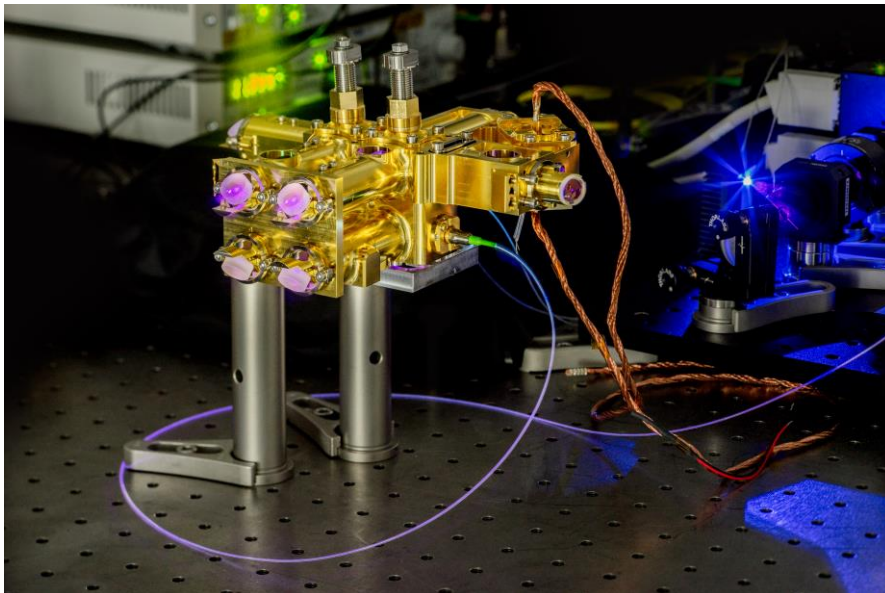


Fig. 3: Entangled photon source for encrypted quantum communication.  
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