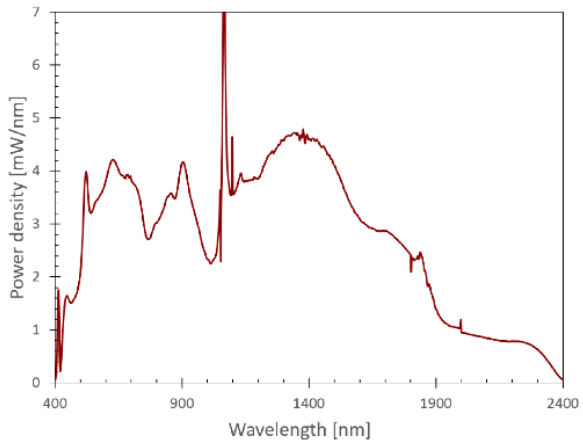
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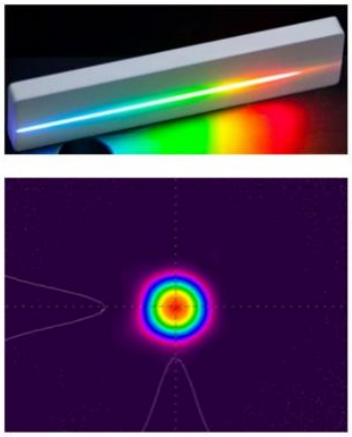
Supercontinuum White Light Lasers

A Powerful Tool for Nano-Photonics and Novel Materials Research

Dr. Nicolai Granzow (NKT Photonics)



Spectral power density of a commercial supercontinuum laser (SuperK FIANIUM FIU-15, Hamamatsu Photonics)



Dispersed laser output projected onto a metal plate and single-mode beam profile of a SuperK supercontinuum laser.

Monday, November 2nd 2026

14:15 – 15:15

Location: LTI Lecture Hall (Building 30.34, Ground Floor)

Abstract:
How to generate white laser light – a seminar talk by Hamamatsu Photonics introducing supercontinuum white light lasers, explaining the physics of supercontinuum generation in photonic crystal fibers and their integration into commercial SuperK lasers. The talk also highlights diverse applications, featuring cutting-edge research from nano-photonics groups worldwide.

Biography:
Physics at Friedrich-Alexander-University Erlangen (Diploma in 2009)
PhD at the Max Planck Institute for the Science of Light (Philip Russell): photonic crystal fibers, nano-photonics, nonlinear optics (PhD in 2013)
NKT Photonics (acquired by Hamamatsu Photonics in 2024, renamed to Hamamatsu Photonics Lasers & Fibers in June 2026)

- Field Sales Engineer 2014-2018
- Sales Manager (Scientific) 2018-2020
- Senior Sales Manager (Scientific) / Key Account Manager with a focus on nano-photonics, materials science, device characterization, and fiber optics 2020-2026

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Supercontinuum White Light Lasers – a Powerful Tool for Nano-Photonics and Novel Materials Research

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Supercontinuum lasers are a technology that combines some of the properties of conventional broadband light sources (like Halogen lamps, LEDs, super-luminescence diodes or laser-driven plasma sources) with the unique properties of single-mode fiber lasers: an extremely broad spectral coverage from ~400-2400 nm emitted as a continuum with an integrated power of up to 10W, and at the same time a Gaussian beam which can be focused down to the diffraction limit, giving rise to a brightness that can exceed conventional light sources by more than 6 orders of magnitude, while staying within the spatial resolution of optical microscopy if needed. This unique combination of optical properties can add value within many applications related to modern science, and as of today there is no other technology that provides high power and extremely broadband (or widely tunable) light with ps pulse duration emitted from a single-mode fiber.

Two decades ago, supercontinuum lasers left their niche evolving into a mature turn-key technology with thousands of systems spread across scientific labs as well as industrial production lines. Besides well-known applications within bio and medical imaging (for example fluorescence confocal microscopy, fluorescence lifetime imaging microscope, super-resolution microscopy, optical coherence tomography or flow cytometry), more and more new applications areas have come up, including steady-state or time-resolved measurement techniques within plasmonics, metamaterials, 2d layered materials, carbon nanotubes, quantum dots, nano-optics, physical chemistry or spectroscopy, along with a wide range of applications within industrial metrology and inline process monitoring.

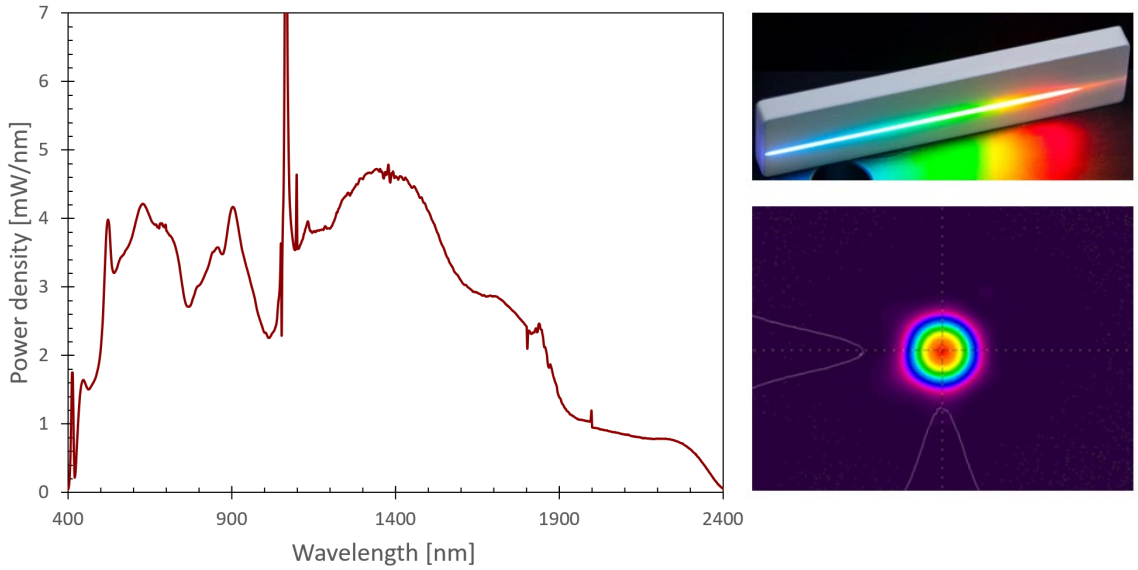


Fig. 1 Left: spectral power density of a commercial supercontinuum laser (SuperK FIANIUM FIU-15, Hamamatsu Photonics); Right: dispersed laser output projected onto a metal plate and single-mode beam profile of a SuperK laser.

My presentation will be divided into two parts: in the first part I give a general introduction to supercontinuum technology, starting from the fundamental physics of white light generation in highly nonlinear photonic crystal fibers leading to the typical properties of supercontinuum laser light, and how these fundamental physics are - embedded in a technical platform that emits white laser light at the press of a button.

In the second part, I will focus on the use of supercontinuum lasers in real world scientific applications, illustrating what makes supercontinuum light unique, showing some accessories that turn supercontinuum lasers into widely tunable ps lasers, and introducing a range of applications in which supercontinuum systems have been successfully implemented as a high-end optical tool, enabling progress within modern science and commercial applications.