

## Spectral-temporal composition matters when cascading supercontinua into the mid-infrared - DTU Orbit (08/11/2017)

### Spectral-temporal composition matters when cascading supercontinua into the mid-infrared

Supercontinuum generation in chalcogenide fibers is a promising technology for broadband spatially coherent sources in the mid-infrared, but it suffers from discouraging commercial prospects, mainly due to a lack of suitable pump lasers. Here, a promising approach is experimentally demonstrated using an amplified 1.55  $\mu\text{m}$  diode laser to generate a pump continuum up to 4.4  $\mu\text{m}$  in cascaded silica and fluoride fibers. We present experimental evidence and numerical simulations confirming that the spectral-temporal composition of the pump continuum is critical for continued broadening in a chalcogenide fiber. The fundamental physical question is concerned with the long-wavelength components of the pump spectrum, which may consist of either solitons or dispersive waves. In demonstrating this we present a commercially viable fiber-cascading configuration to generate a mid-infrared supercontinuum up to 7  $\mu\text{m}$  in commercial chalcogenide fibers.

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