Optimization and characterization of highly nonlinear fiber for broadband optical time lens applications.

We demonstrate simple and intuitive methods, for dispersion optimization and characterization of highly nonlinear fiber (HNLF) for use in four-wave-mixing (FWM) based time lens applications. A composite dispersion-flattened HNLF is optimized for high bandwidth time lens processing, by segmentation to mitigate FWM impairments due to dispersion fluctuations. The fiber is used for FWM conversion of 32 WDM-channels with 50 GHz spacing in a time lens, with ~4.6 dB total efficiency, and <1 dB per-channel efficiency difference. The novel characterization method is based on two tunable continuouswave lasers. The method is experimentally verified to predict the spectral output profile of time lenses for broadband multicarrier input, with detailed numerical simulations for support.