ALL-NORMAL DISPERSION SUPERCONTINUUM GENERATION IN A MICROSTRUCTURED BIREFRINGENT FIBER PUMPED WITH A PULSED FIBER LASER

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Since the year 2000, when Ranka et al. demonstrated a suitability of microstructured fibers for supercontinuum generation [1], numerous fibers were designed and fabricated bringing a significant progress in a generated spectra quality. In particular, it was shown that normal dispersion fibers are suitable for generation of coherent supercontinuum [2]. At the beginning, the mid-infrared range of all-normal dispersion supercontinuum in silica fibers was limited to 1.5 µm [2], since a difficulty in shifting the maximum of normal dispersion in such fibers beyond 1.3 µm [3]. As a result a silica transparency window was not fully covered.

Recently, we addressed this issue, by designing and fabricating [4-6] germanium-doped microstructured fibers and succeeded to generate the all-normal dispersion supercontinuum in silica fibers up to 2.5 µm. In those works, we used a commercial pulse fiber laser operating at 1.55 µm [5] and a non-collinear optical amplifier (NOPA) tuneable in 1.8-2.4 µm range [6] as pumping sources.

Here, we investigate the supercontinuum generation in an all-fiber system. The birefringent microstructured silica fiber was connected with the ultra-simple, fully fiberized, polarization maintaining fiber laser system generating 26-fs pulses at 1.55 µm with average output power of 145 mW and 45 MHz repetition rate [7]. As a result we obtained the fully fiberized all-normal dispersion coherent polarized supercontinuum source, which is robust and guarantees a turn-key stable operation.

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