5. Conclusion

A nearly octave-spanning frequency comb in the visible spectral range can be produced by pumping a tapered PCF with 4.3 pJ pulses at 530 nm at a repetition rate of 14 GHz. The spectral broadening is achieved by soliton formation and concomitant emission of dispersive waves. Compared to previous experiments with 35 fs pulses [3], the longer pulse duration reduces the energy transfer into the dispersive waves and generates a very flat spectrum. As only 6 W of the 12 W of the infra-red power available in our setup was used, it should be possible to maintain the calibration bandwidth up to repetition rates as high as 28 GHz. In a first experiment we observed the coherence of the optical spectrum by beating the LFC with a narrowband 532 nm cw laser, showing the preservation of the comb structure. The coherence and side-band suppression of the emitted spectrum will be presented elsewhere [26], showing that the light source may prove useful in the calibration of high-resolution astronomical spectrographs – the demonstrated −20 dB bandwidth of 235 nm corresponds to 76% of the bandwidth of HARPS [20]. In a next step we plan to further increase the spectral bandwidth and improve its flatness by shaping the spectrum with a spatial light modulator [17, 27].

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