HNLF parametric conversion. In terms of overall power efficiency in the amplifier (HNLF-TDF-HDF) from the pump toward the tunable idler, neglecting the signal power as it 100 times lower than the pump's, a figure of –20 dB is reached at 2043 nm. Figure 7(b) also demonstrates that the output OSNR is improved at longer wavelengths thanks to the addition of the HDF.

4. Conclusion

A SWIR laser source delivering up to 20 mW, of which the wavelength can be freely selected from 2 μm to 2.1 μm is reported. This source is based on an original design that embeds a silica-fiber based parametric wavelength converter, operating over more than 750 nm, assisted by SWIR gain obtained successively in a TDF and a HDF. Dispersion fluctuations in the HNLF are leveraged to obtain a broadband conversion that allows for the simultaneous generation of the HDFA pump seed and of the SWIR output. The three amplification stages are pumped successively using the same L-band laser and apart from the fibers, all elements used in this experiment are off-the-shelf devices intended originally for telecommunication purposes. Additionally, multi-GHz intensity modulation of this source is possible by modulating the shorter-wave O-band signal with a standard communication modulator at the input of the parametric amplifier, as shown by previous works [11, 12]. Further ongoing work concerns the reduction of the output phase noise, and consequently of its linewidth, with the help of a dispersion-stabilized and stress-insensitive HNLFs to quench SBS in place of pump phase dithering.

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