













### 3. Conclusion

In conclusion, we have demonstrated the efficient conversion of long (>300ps) short-wave infrared pulses in a two-stage wavelength converter / amplifier with over 30 dB net on-chip conversion efficiency. The setup consists of a compact silicon waveguide and standard pure silica PCF as well as small and low-cost sources used for generating the pump for the silicon waveguide converter/amplifier stage. Through further dispersion engineering of the silicon waveguide [14], the continuous wave optical parametric oscillator that was used in this proof-of-principle experiment could be replaced by cheap near-infrared laser sources allowing downconversion further into the mid-infrared.

We believe our results highlight the potential of combining silica fiber and silicon waveguides for nonlinear optics using pump sources around 2.3  $\mu\text{m}$  where the low linear losses of the silica PCF and the low nonlinear losses of the silicon waveguide allow for efficient four-wave mixing.

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