frequency combs, phase-locking in our system occurs as a result of a combination of coherent generation of Stokes and anti-Stokes frequencies from SRS [28], and FWM interactions between the different Stokes and anti-Stokes pairs, enabling broadband coherent frequency comb generation.

4. Conclusion

In conclusion, we demonstrate near-octave spanning, coherent mid-IR frequency comb generation in a silicon microresonator. The high-repetition rate phase-locked state is a result of the interplay between FWM and SRS. The integrated PIN structure allows for direct probing of the RF characteristics of the comb generation dynamics by exploiting silicons intrinsic 3PA loss. We believe these results represent a significant step toward a fully integrated frequency comb source in the mid-IR regime.

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