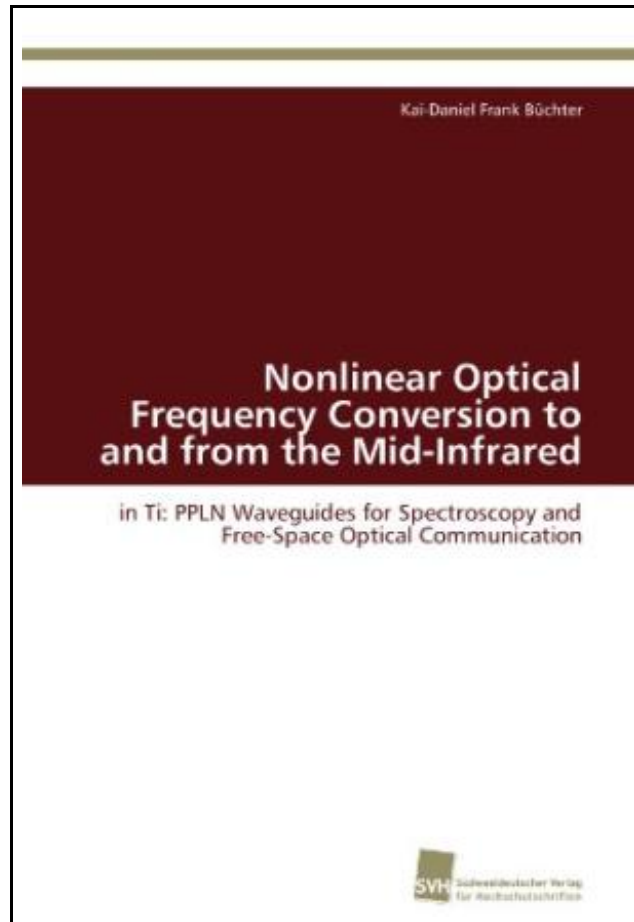


# Nonlinear Optical Frequency Conversion to and from the Mid-Infrared



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## ***Reviews***

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***(Prof. Maya Hand)***

## NONLINEAR OPTICAL FREQUENCY CONVERSION TO AND FROM THE MID-INFRARED



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Condition: New. Publisher/Verlag: Südwestdeutscher Verlag für Hochschulschriften | in Ti: PPLN Waveguides for Spectroscopy and Free-Space Optical Communication | Mid-infrared (MIR) sources and detectors are of strong interest. Due to a lack of favorable lasers, frequency conversion using nonlinear optical difference-frequency generation (DFG) has been a popular means to generate MIR radiation using near-IR (NIR) sources. On the detector side, optical frequency conversion can be used to realize a hybrid up-conversion detector (UCD). In this case, radiation is converted from the MIR to the NIR or even visible, where detectors with exceptional properties are available. Such devices, based on Ti-indiffused waveguides in periodically poled Lithium Niobate, were investigated. Over 10 mW of tunable radiation at either 3.4  $\mu$ m (3.8  $\mu$ m) were generated, using pump lasers at 1064 nm (1100 nm) and 1550 nm wavelength. Similarly, UCDs based on either DFG or SFG were thoroughly characterized, which convert radiation within a few nm bandwidth around a design wavelength, and can be temperature-tuned by tens of nm. The devices were combined in order to realize free-space optical transmission lines. This way, MIR-spectroscopy of methane was performed with NIR instrumentation only. Also, it was shown that transmission through turbulent channels can be improved. | Format: Paperback | Language/Sprache: english | 132 pp.



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