12th Annual Rice Quantum Institute Colloquium

Compact MID-IR Source for High Sensitivity Trace Gas Detection Using Nonlinear Frequency Mixing of Diode Lasers

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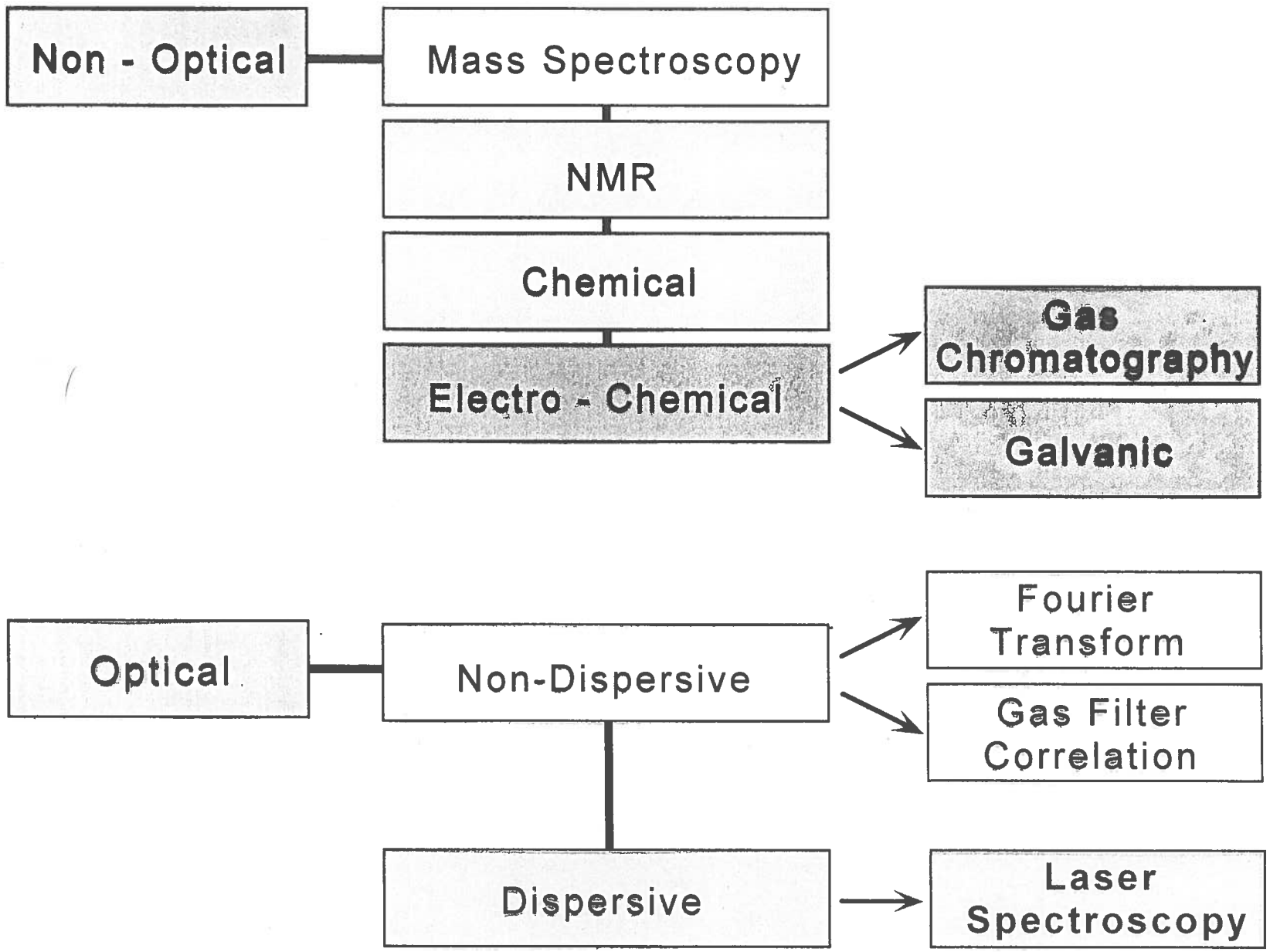
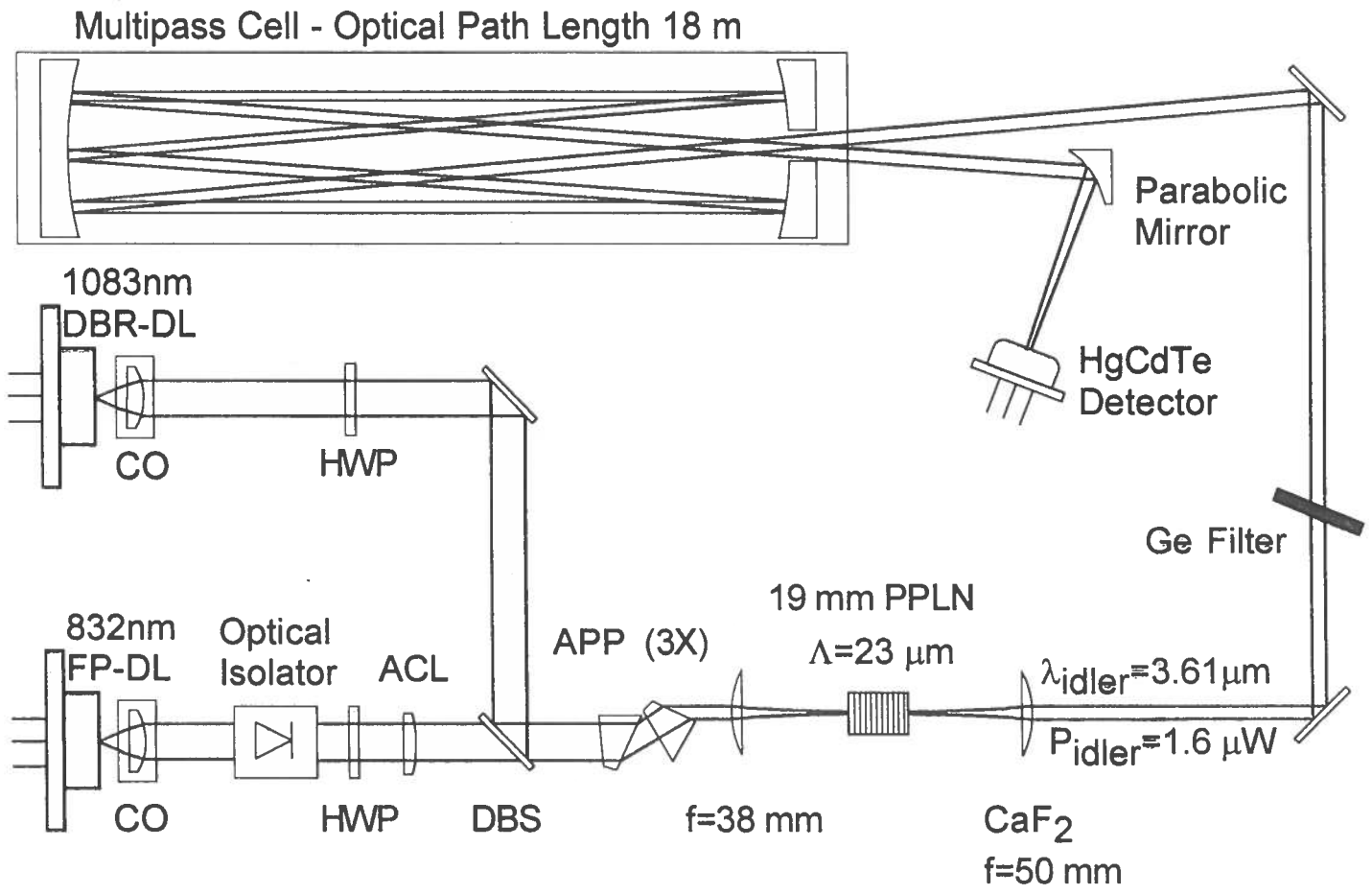
- Concept
- Characteristics
- Spectroscopic Results
- Summary

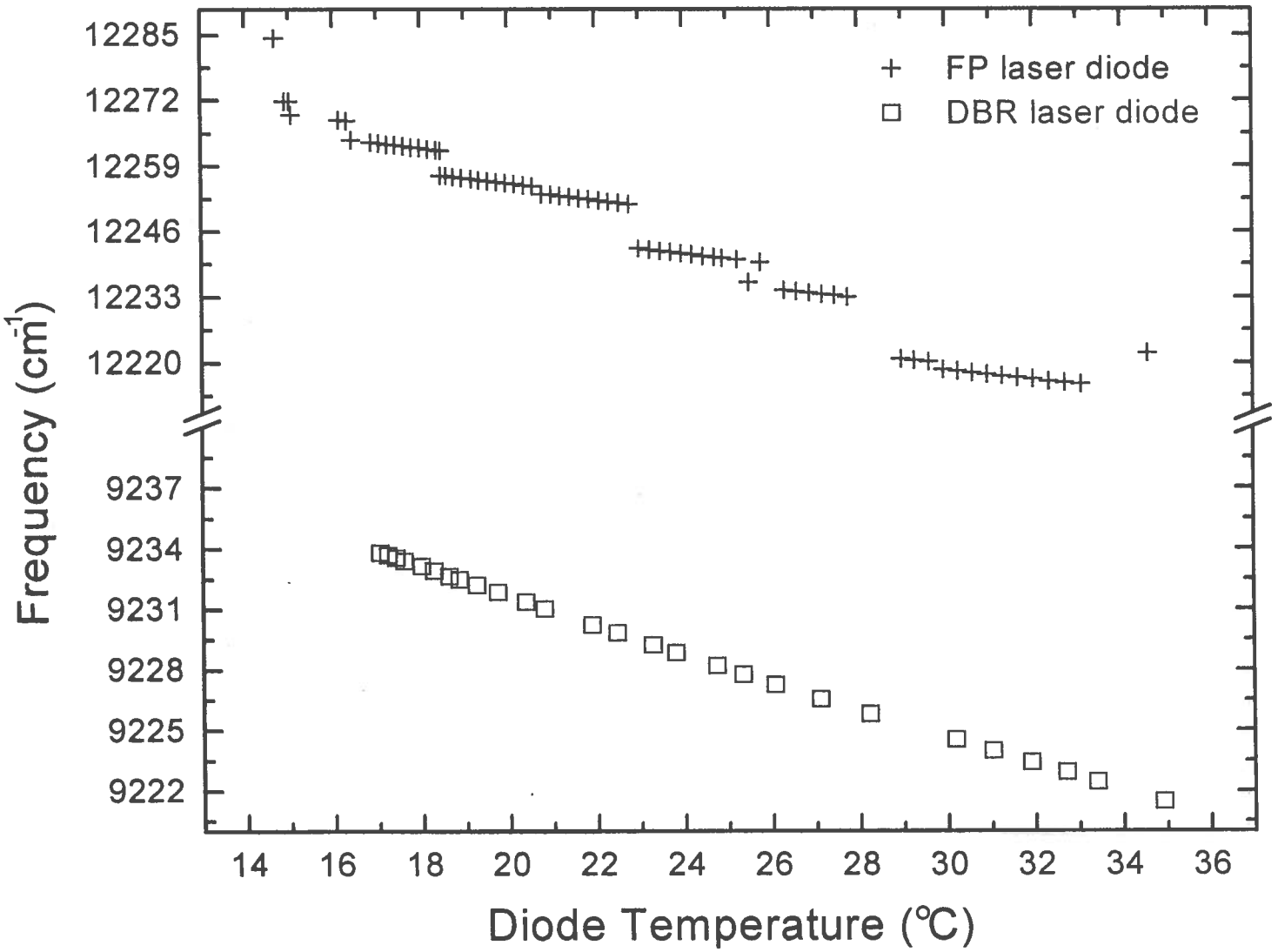
EXISTING METHODS FOR TRACE GAS DETECTION



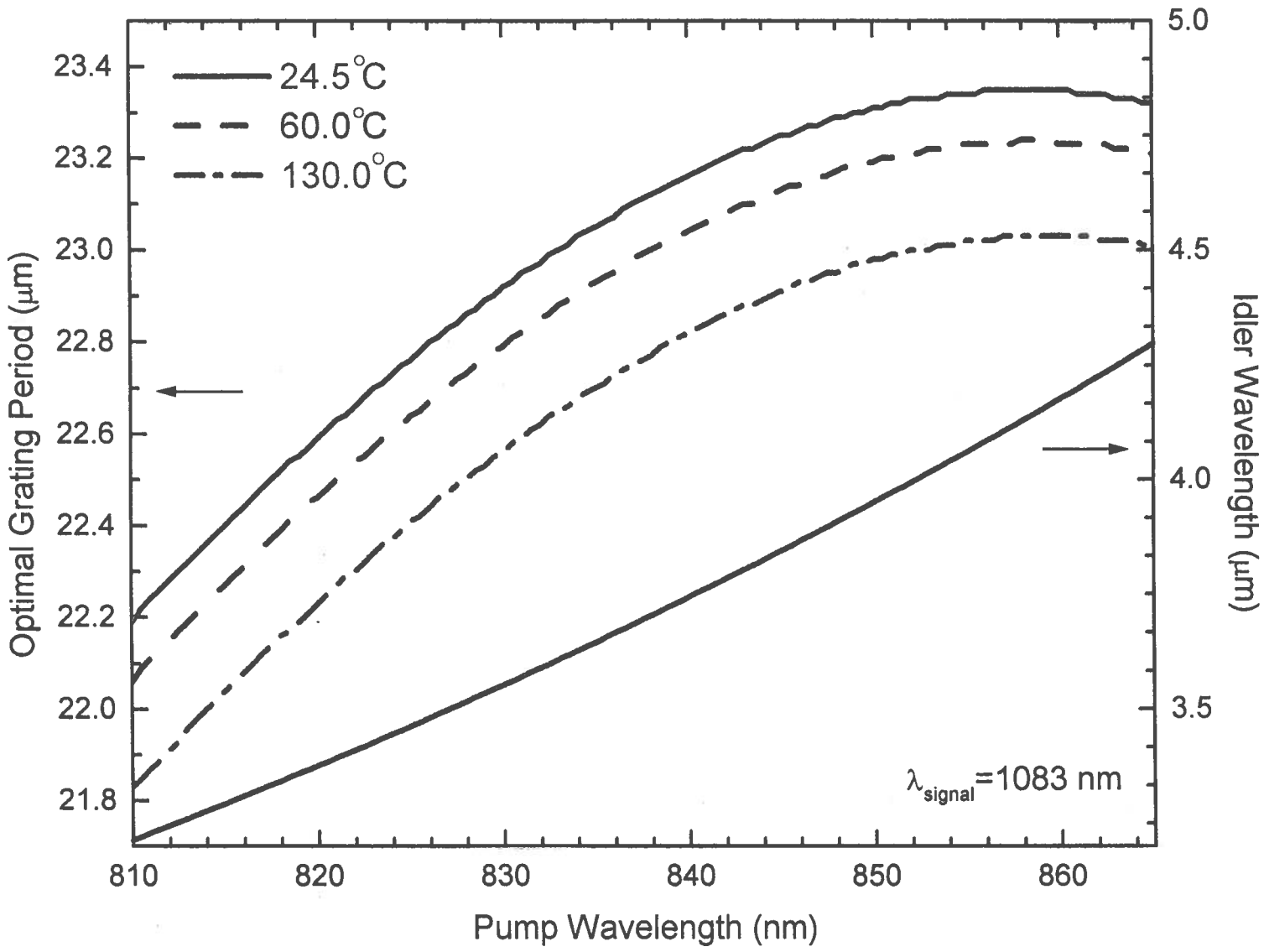
ALL-DIODE PUMPED DFG - SENSOR USING PPLN



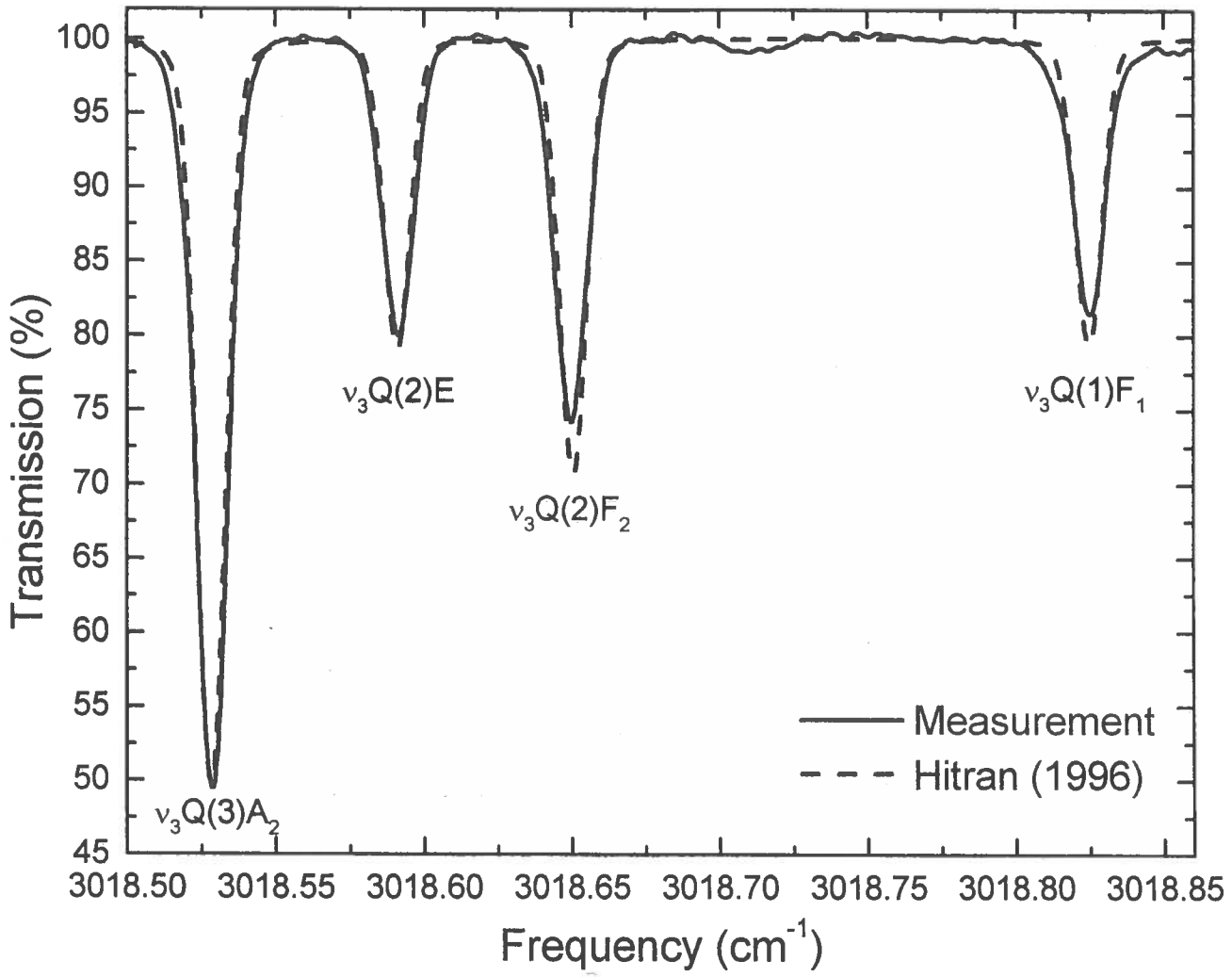
Diode Laser Wavelength Tuning Characteristics: Frequency vs. Diode Laser Temperature



Computed Tuning Characteristics of a Quasi-Phase Matched PPLN Crystal



CH_4 Spectrum in the Q-branch at 3.31 μm



SUMMARY

Diode laser based trace gas sensor:

- Compact narrow-linewidth MID-IR light source
- High nonlinear conversion efficiency
- High resolution and sensitivity
- Next generation: Fiber-coupled / Fiber-amplifier

Robert F. Curl

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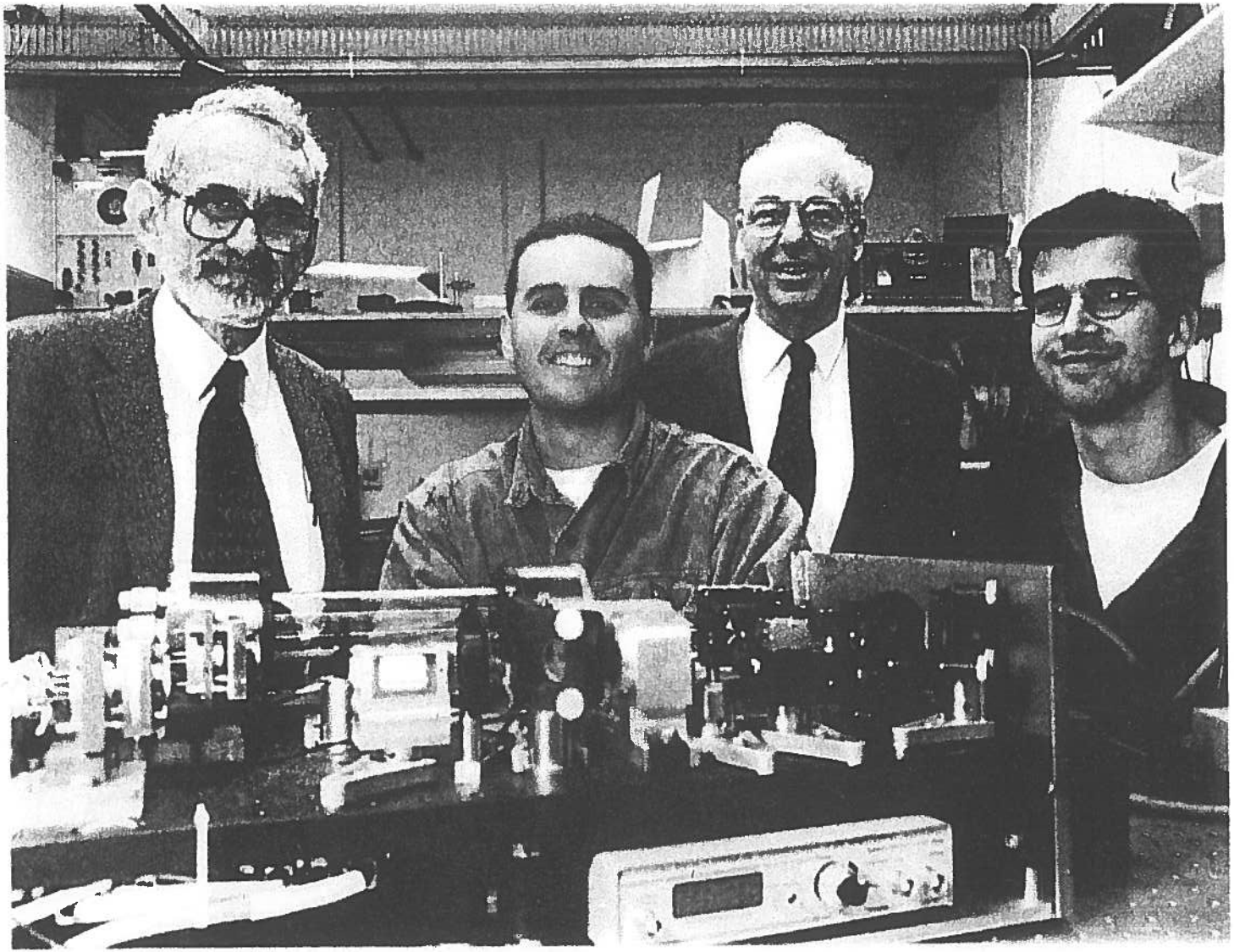

http://www.ruf.rice.edu/~lasersci/