NASA SBIR/STTR Technologies

One-Dimensional Tunable Photonic-Crystal IR Filter

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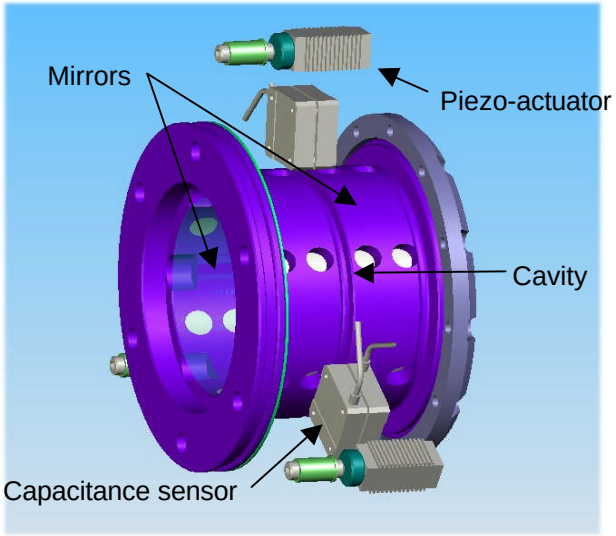
Identification and Significance of Innovation

- Photonic crystals-based tunable IR bandpass filter.
- Bandpass < 0.1 cm^{-1}; tunability range ≤ 10 cm^{-1}; acceptance angle > 1°; background rejection < 30 dB; aperture ~ 1 inch.
- Electronically controlled transmission wavelength tuning.
- High compactness and ruggedness.



Technical Objectives and Work Plan

- Demonstrate the feasibility of an ultra-narrow tunable optical bandpass filter.
- Demonstrate that an optical filter, based on specific features of photonic crystals, can provide the stated specifications.
- Analyze the filter performance and select optimal structure parameters.
- Arrive at preliminary design of an ultra narrow tunable optical bandpass filter.

NASA and Non-NASA Applications

- Expand capabilities of NASA's Earth Science Enterprise:
  - high resolution multi-spectral imaging
  - high accuracy measurements of atmospheric and surface parameters from space and airborne platforms
- Wide range of commercial applications:
  - Combustion diagnostics, spectroscopic monitoring

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Non-Proprietary Data