

Dual Fabry-Perot Refractometer for Infrasound Dynamic Pressure Measurements

Tuesday, 20 June 2023 10:16 (1 minute)

This poster presents the recent development and preliminary results of a compact laser refractometer based on a dual Fabry-Perot scheme at 1550 nm for dynamic infrasound pressure measurements. The measurement of the beat frequency between two lasers slaved to two Fabry-Perot cavities allows to follow the variation of the refractive index of the air, and thus to estimate the pressure inside the measuring cavity. Associated with a dynamic infrasound pressure generator developed at CEA, the generated pressure variation, controlled and repeatable, is directly printed on the measured beat frequency and compared to infrasound sensors. The main objective of this work is to demonstrate the capabilities of a compact laser refractometer whose simple and unique design has been adapted from static absolute pressure measurements to dynamic infrasound pressure measurements. The resulting sensor has demonstrated its ability to measure dynamic pressure over the entire infrasound frequency band, with excellent performance. Further studies on the specific shape of the frequency response are underway to evaluate the discrepancy between the measurements and the model, and to assess its uncertainty budget.

E-mail

paul.vincent@cea.fr

Promotional text

This work presents the recent development of a compact laser refractometer for measuring infrasound pressure. The main objective of this breakthrough is to demonstrate the ability of this technology to achieve a metrology standard on-lab and potentially on-field in the future.

Oral preference format

Primary authors: Dr VINCENT, Paul (Commissariat à l'énergie atomique et aux énergies alternatives (CEA)); Mr KARCHER, Romain (Commissariat à l'énergie atomique et aux énergies alternatives (CEA))

Co-author: Mr BOISSEAU, Guillaume (Commissariat à l'énergie atomique et aux énergies alternatives (CEA))

Presenter: Dr VINCENT, Paul (Commissariat à l'énergie atomique et aux énergies alternatives (CEA))

Session Classification: Lightning talks: P1.2-1, P3.1, P3.4, P4.5

Track Classification: Theme 3. Monitoring and On-Site Inspection Technologies and Techniques: T3.1 Seismic, Hydroacoustic and Infrasound Technologies and Applications