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Postdoctoral opportunities in engine diagnostics

The Project Description

1) Development of advanced laser diagnostics for high-pressure combustion in heavy duty engines

Isobaric combustion at pressures of 300 bar is a promising route to achieve up to 60% engine efficiency in heavy duty engines. Understanding the governing combustion physics at these extreme pressures is needed to develop this groundbreaking technology. A Volvo optical engine, capable of reaching pressure above 200 bar, is available at KAUST. The postdoctoral appointee will work on the development of novel diagnostics for temperature and species measurements in this extreme combustion environment. Limitations of planar laser induced fluorescence of fuel-tracers, OH and formaldehyde at high operating pressures will be investigated and alternative approaches that benefits from the elevated pressure will be explored, including 2D Raman scattering and Laser induced grating spectroscopy.

2) Development and application of pulse-burst laser diagnostics in optical engines

Pulse-burst lasers allows extending traditional ns-laser diagnostics (PLIF, PIV, Raman, LIGS...) to high-repetition rates (10-100 kHz), enabling time-resolved measurements of combustion during a single engine cycle, and providing greater insight in the underlying physics. The postdoctoral appointee will work on the development of pulse-burst laser diagnostics and its application to heavy-duty and light duty optical engines. Ongoing researches focuses on pre-chamber ignition in heavy duty engines, and on pre-ignition and knock studies in SI engines.

The appointee will work in an interdisciplinary team with expertise in combustion, chemistry and fluid mechanics. As part of the postdoctoral tenure, the appointee is expected to assist with the supervision of graduate students, and to collaborate with visiting scientists from other institutions. The successful candidate will conduct independent research under the mentorship of Professor Magnotti, and in close collaboration with Professor Johansson's group.

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Essential Requirements

Successful candidates must have a Ph.D. in engineering, applied physics or other close fields. Strong verbal and written communication skills in English, and the ability to work in an interdisciplinary and international team are required. Candidates should have a proven record of original contributions in laser diagnostics for combustion research. Experience with pulse-burst lasers is highly desirable.

How to Apply

Competitive salary, free housing, medical, dental and life insurance, relocation allowance and yearly air travel allowance. No income tax is paid in Saudi Arabia. Applications will be reviewed until the position is filled. Prospective candidates should contact Professor Gaetano Magnotti (gaetano.magnotti@kaust.edu.sa).

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