

Postdoctoral opportunities in “Experimental investigation of low-NOX aerodynamically stabilized hydrogen flames for propulsion and power”



The Advanced Laser Diagnostics and Turbulent Combustion lab, affiliated with the [CCRC](#) at KAUST has an immediate opening for a qualified postdoctoral researcher to experimentally investigate *low-NOX aerodynamically stabilized hydrogen flames for propulsion and power*. The project is part of an international collaboration between KAUST, the Institut National Polytechnique de Toulouse and the CNRS in France. A novel dual-swirl combustor burner developed in Toulouse is a promising solution to retrofit existing aero-derivative gas-turbine combustor for low-NOx, 100% H₂ operation, but improved understanding of the flame-stabilization mechanism and NOx production is needed. The project aims to 1) unveil the physical mechanism responsible for the lift-off and attachment of swirled hydrogen flames with a focus on elevated pressure and Reynolds numbers approaching those of industrial applications; 2) validate a framework of large eddy simulations of turbulent hydrogen-air flames valid for both non-premixed and premixed combustion.

The postdoctoral appointee will conduct quantitative Raman/Rayleigh/OH and NO LIF measurements in the dual-swirl burner operated at atmospheric and elevated pressure. Measurements will reveal the structure of the flame, the nature of the stabilization mechanism, and the relative importance of premixed and non-premixed combustion. The data will also be instrumental in developing and validating numerical models for turbulent hydrogen-air flames at gas-turbine relevant conditions. In addition to employ existing, state-of-the-art laser diagnostics equipment, and high-pressure combustion facilities, the appointee will contribute to the development of 2D Raman/LIF diagnostics, and high-speed 1D Raman measurements.

The appointee will work in an interdisciplinary team with expertise in laser diagnostics, combustion, chemistry, and fluid-mechanics. As part of the postdoctoral tenure, the appointee will assist with the supervision of graduate students, and collaborate with visiting scientists from other institutions. The successful candidate will conduct independent research under the mentorship of Professor Magnotti, and will be expected to publish in the open literature.

Qualifications

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 combustion research and/or laser diagnostics.

Benefits

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. Expected start-date is Summer 2023

How to Apply

Prospective candidates should email Professor Gaetano Magnotti (gaetano.magnotti@kaust.edu.sa) a package that includes: (i) a brief cover letter describing their background and interest in the position, (ii) a C.V., (iii) two representative publications, and (iv) names and email addresses of three referees.