POLITECNICO DI MILANO

PhD in SCIENZE E TECNOLOGIE ENERGETICHE E NUCLEARI / ENERGY AND NUCLEAR SCIENCE AND TECHNOLOGY - 40th cycle

INTERDISCIPLINARY Research Field: EXPERIMENTAL AND NUMERICAL STUDY OF FLAME STABILITY AND POLLUTANT EMISSIONS IN INNOVATIVE HYDROGEN AND NATURAL GAS BURNER SYSTEMS

Monthly net income of PhDscholarship (max 36 months)
€ 1500.0 In case of a change of the welfare rates during the three-year period, the amount could be modified.

Context of the research activity	
Motivation and objectives of the research in this field	Interdisciplinary PhD Grant The PhD research will be carried out in collaboration with research groups of the PhD programme in "**INDUSTRIAL CHEMISTRY AND CHEMICAL ENGINEERING**". See https://www.dottorato.polimi.it/?id=422&L=1 for further information.
Methods and techniques that will be developed and used to carry out the research	This project adopts an interdisciplinary approach, combining the experimental expertise of the Combustion and Optical Diagnostics Lab (DENG) and the numerical modeling capabilities of the CRECK Modeling Lab (CMIC). The methodology includes: - Conducting an experimental study using advanced optical diagnostics to analyze the flame structure, stability, and behavior generated by an innovative staged burner. - Performing reactive computational fluid dynamics (CFD) simulations including detailed kinetics to predict combustion outcomes and optimize burner design. - Iteratively refining experimental and simulation models based on combined insights, ensuring the development of accurate, reliable combustion technologies for H2 and H2/NG mixtures
Educational objectives	To deepen knowledge in the thermo-fluid dynamic

	phenomena related to combustion systems, with a focus on hydrogen and hydrogen/natural gas mixture combustion. The program aims to provide up-to-date skills in advanced optical diagnostic techniques, numerical simulation methodologies, and data processing techniques. Additionally, it will offer robust training in both experimental and numerical research methodologies, enabling the PhD candidate to design, conduct, and analyze complex experiments, as well as develop accurate and reliable numerical models.
Job opportunities	Job opportunities include academic positions, roles in industrial R&D in energy production, automotive, aerospace, and chemical processing. Graduates can also work in consulting firms specializing in energy systems and environmental impact. Additionally, there are opportunities in technology development and innovation, particularly in startups and tech companies developing advanced combustion technologies and simulation tools.
Composition of the research group	0 Full Professors 2 Associated Professors 0 Assistant Professors 1 PhD Students
Name of the research directors	Fabio Cozzi, Alberto Cuoci

Contacts
Prof. Fabio Cozzi: fabio.cozzi@polimi.it Prof Alberto Cuoci: alberto.cuoci@polimi.it

Additional support - Financial aid per PhD student per year (gross amount)	
Housing - Foreign Students	--
Housing - Out-of-town residents (more than 80Km out of Milano)	--

Scholarship Increase for a period abroad	
Amount monthly	750.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
Educational activities: Financial aid per PhD student is available for purchase of study books

and material, funding for participation in courses, summer schools, workshops and conferences, instrumentations and computer, etc. This amount is equal to 10% of the annual gross amount, for 3 years.

Teaching assistantship: Availability of funding in recognition of supporting teaching activities by the PhD student. There are various forms of financial aid for activities of support to the teaching practice. The PhD student is encouraged to take part in these activities, within the limits allowed by the regulations.

Computer availability: individual use

Desk availability: individual use

Awards: Awards will be recognized to the PhD candidate up to € 2000 (gross amount) per year, in case of exceptional achievements in the research project, subject to the evaluation of the research director.