Research Grants for PhD students from the China Scholarship Council

Information Form (please read the guidelines carefully on the website www-csc.utt.fr)

Supervisor's name :	CHETEHOUNA	Given names :	Khaled
Status (prof., assistant prof., …) :	Professor		
Laboratory :	PRISME	Website address :	http://www.univ-orleans.fr/en/prisme
Institution :	INSA Centre Val de Loire	Website address :	http://www.insa-centrevaldeloire.fr/

Scientific competence of the supervisor:

Prof. Khaled Chetehouna is Full Professor in Fire and Energy Sciences, and Vice-Chairman for Research at the National Institute of Applied Sciences (INSA) of the Centre Val de Loire region, France. He is head of the P2CF (Permeation Pyrolysis Combustion and Fire) team at the PRISME Laboratory (EA 4229).He is a member of the strategic board of the CNRS French Research Group in Fire Sciences GDR “Feux” n°2864 since 2010 and was the Director of Research and Development at INSA CVL between september 2019 and september 2022. His research activities are devoted to Fire Sciences and Fire Safety, and in particular: the characterization of Fire Degradation of

Two major publications in the field proposed for the PhD :

1. A. Wang, B. Manescau, K. Chetehouna, Steve Rudz and Ludovic Lamoot, Experimental study on the flame extension and risk analysis of a diffusion impinging flame in confined compartment, Journal of Fire Sciences,
2. S Rudz, K Chetehouna, O Séro-Guillaume, E Pastor and E Planas., Comparison of two methods for estimating fire positions and the rate of spread of linear flame fronts”, Measurement Science Technology, 20(2009)

Website address of the personal page : https://www.researchgate.net/profile/Chetehouna Khaled

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Description of the research work proposed for a PhD ***Topic # (see list) :*** VI-2

Title : Use of an image processing method to evaluate the unburnt gases in a flame impinging a ceiling in a confined enclosure.

Subject :

During a fire in a room, it is possible that a flame may spread along a ceiling and thus contribute to an increase in the heat flux and therefore the temperature. Under these conditions, the risk of fire spreading to another compartment increases and constitutes a threat to people and equipment: an unacceptable situation for fire safety. In this context, the characterization of the behavior of flames impacting ceilings and thermal gradients observed in closed or semi-closed environments is of great interest for fire safety engineering. Moreover, it has been shown in scientific work that in a confined enclosure, unburnt gases have a major role in the risk of spreading a fire. Based on a flame impacting a ceiling, the production of unburnt gases can be done due to the under-ventilation of the room and also by the pyrolysis of the ceiling impacted by the flame. In order to highlight the role of unburnt gases in the progression of a fire, it is necessary to put in place tools capable of properly mapping the field of unburnt gases throughout the fire enclosure. For this, an image processing method can be used and coupled to gas analyzes made by GC-MS. And thus, from the overall data, it will be possible to highlight physical parameters which have a significant effect in the propagation of a fire are of interest to the scientific community. Among these parameters, there is ignition or auto-ignition of unburnt gases mixed with outside air conducting to a thermal accident such as backdraft and flashover.

Keywords :

Image processing method; Unburnt gases in a impinging flame, GC-MS analysis,under ventilated, CFD modelling.

Expected collaborations :

The second supervisor of this thesis is Dr. Brady Manescau.He is an Associate Professor in energetics and chemical engineering at INSA Centre Val de Loire. He belongs to PRISME lab. His main research interests concern with study on the effect of confinement on a flame impinging a plate and the reactive flows inside the combustion process. Until now, he has published more than 22 journal and conference papers. Since Janvier 2017, he is member of the P2CF team “Permeation, Pyrolyse, Combustion and Fires” managed by Prof Khaled Chetehouna.

Background required from the applicant :

Master degree in energy engineering with a strong background in fire science ; Very good knowledge in combustion process and fire safety, such as conditions of the ventilation on the combustion process and the different thermal accidents. An excellent track-record in the field of numerical simulation on combustion or fire. Fluent in English and eager to write research papers.

Existence of a PDF file detailing the proposal ("yes" or "no") : Yes

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