

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 an international expert on Fire and Engineering Sciences, and Vice-Chairman for Research at INSA Centre Val de Loire. He is head of the P2CF (Permeation Pyrolysis Combustion and Fire) team at the PRISME Laboratory and a member of the strategic board of the CNRS French Research Group in Fire Sciences GDR "Feux" n°2864. Until now, he has published more than 150 papers (journal and conference articles and book chapters). He is supervisor of 3 Post-docs, 15 PhD students (9 have defended), 5 Research engineers and 12 research M.S. degrees.

Two major publications in the field proposed for the PhD :

1. K. Chetehouna, N. Grange, N. Gascoin, L. Lemée, I. Reynaud, S. Senave, Journal of Analytical and Applied Pyrolysis, Vol. 134, pp. 136-142, 2018.
2. S. Rudz, K. Chetehouna, O. Séro-Guillaume, E. Pastor, E. Planas, Measurement Science Technology, Vol. 20, Article ID 115501, 10pp, 2009.

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

Supervisor's email : khaled.chetehouna@insa-cvl.fr

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 and CNRS French Research Group in Fire Sciences GDR "Feux" n°2864.

Background required from the applicant :

Master degree in energy engineering with a strong background in fire science ; 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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