

PhD position at IFP Energies nouvelles (IFPEN) Physical sciences

Development of an absorption measurement procedure to control particulate emissions from internal combustion engines

Particles in the atmosphere are responsible for the degradation of air quality. They can cause respiratory and cardiovascular diseases, and thus lead to a premature death. A large part of these particles is emitted by combustion processes, including engines. To regulate and finally limit these emissions, it is necessary to have tools to qualify these particles. In this context, IFPEN has developed an optical measurement system based on absorption phenomena. The response of this measurement system in the presence of particles is to be explored in the context of a PhD.

In the first phase of this work, the PhD student will acquire a solid knowledge on carbon particles as well as a clear and exhaustive vision of the different methods of measurement and characterization of these particles. Particular attention will be paid to the methods of particle characterization by UV absorption.

The second phase of this work will focus on carrying out experiments in a laboratory reactor, representative of an engine exhaust line, and making it possible to acquire a database necessary for understanding the physical phenomena involved. State of the art reference devices (SMPS, DMS ...) are at will be used to determine particle size and in number. Physical shape, structure, and chemical characteristics of the particles (composition) will be obtained by using cutting edge analytical instrumentation available at IFPEN and University of Lille laboratory. This phase will link the observed absorption signal to the characteristics of the particles and define the area of validity of our approach to measure atmospheric particulates.

Keywords: Absorption, emission, particles, optical measurement

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IFPEN supervisor	Dr LECOMPTE Matthieu, mobility and systems direction, matthieu.lecomppte@ifpen.fr
PhD location	IFP Energies nouvelles, Rueil-Malmaison, France
Duration and start date	3 years, starting preferably on October 1, 2019
Employer	IFP Energies nouvelles, Rueil-Malmaison, France
Academic requirements	University Master degree in relevant disciplines
Language requirements	Fluency in French or English, willingness to learn French

For more information or to submit an application, see theses.ifpen.fr or contact the IFPEN supervisor.

About IFP Energies nouvelles

IFP Energies nouvelles is a French public-sector research, innovation and training center. Its mission is to develop efficient, economical, clean and sustainable technologies in the fields of energy, transport and the environment. For more information, see www.ifpen.fr.

IFPEN offers a stimulating research environment, with access to first in class laboratory infrastructures and computing facilities. IFPEN offers competitive salary and benefits packages. All PhD students have access to dedicated seminars and training sessions.