

Internship “Specification and characterization of brake wear particle model aerosols”

Description:

IFP Energies nouvelles is a major player in research and training in the fields of energy, transport, and environment. Among its objectives, IFPEN conducts research aimed at improving the energy efficiency of mobility solutions, as well as characterizing and limiting their potential impact on air quality.

While particulate emissions from internal combustion engines have been drastically reduced with the generalization of particulate filters, the contribution of non-exhaust emissions (NEE) from tire/road and disc/pad abrasion continues to grow; this trend should also continue in the coming years due to the electrification of the French and European vehicle fleets.

Integrated within the Mobility and Systems division, you will work on the reproduction of “exhaust and non-exhaust” model aerosols, with a focus on the particles from brake abrasion (disk/pads). Your missions will be the following:

- Thanks to the extensive databases available (Web of Sciences...), continue the bibliographic work already carried out within the division regarding the topic of brake wear particles (BWP), to better define their main characteristics (mass, number, size, and chemical composition in particular)
- Study the possibilities to supply and implement model particles able to reproduce a representative BWP-type aerosol in the laboratory and initiate recommendations, also considering the IFPEN equipment and protocols already available and/or necessary for this task
- After becoming autonomous with the laboratory experiment and its best-practice protocols to reproduce an “exhaust” type aerosol, the intern upgrades the experiment with a powder suspension device. The modified setup is then evaluated in terms of its performances, limitations, and associated constraints, to reproduce a model aerosol of brake model particles

The final deliverable of this internship will be a summary report to gather the bibliography, the possibilities, and recommendations in terms of synthetic particles supply and implementation, as well as the main learnings of the experimental campaign and recommendations to extend the fields of application of the equipment, from exhaust to non-exhaust particles.

The continuation of this work within the framework of a IFPEN PhD thesis at the end of the internship, is possible.

Requested profile and skills:

Master 2 / engineer student with knowledge in physic and chemistry (aerosols physic in particular)

Use of computer/office software necessary to carry out the missions entrusted and daily activities

Interpersonal skills, rigour, and the ability to take initiatives and propose new ideas

Writing quality, English language mastery (reading, writing)

Duration and dates: 5 to 6 months (~24 weeks) from february/april 2023

Practical information: The internship will take place at IFP Energies nouvelles in Rueil-Malmaison (west of Paris). The intern will be granted with a financial compensation (unless granted otherwise).

Interested ? Send a letter of motivation and a CV to :

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