**Postdoctoral position at CORIA, Normandie Université, France**

# *Primary atomization analysis through liquid-gas interface description. Application to direct injection*

**CORIA department:** TASC (Turbulence, Atomization& Sprays, Chaos)

**Duration:** 12 months renewable one time

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**Keywords:** Atomization, Morphological analysis, liquid-gas interface tracking, velocimetry.

**Summary:** In the context of pollutant emission reduction and engine performance enhancement, a great attention is put on the fuel injection process. The efficiency of the injection and of the atomization of fuel has noticeable consequences on evaporation, mixing and combustion processes. The objective of this work is to perform a sharp analysis of the primary atomization in the near field of direct injection nozzle orifices. The particular effects of the nozzle internal geometry and of the combustion chamber flow conditions will be considered here. This analysis will be based on the use of advanced optical techniques developed at CORIA (localization, tracking and morphological analysis of liquid-gas interfaces by fast imaging, liquid phase velocity measurement by two-pulse femtosecond imaging, ballistic imaging and laser correlation velocimetry (VLC)).

The results obtained with these advanced analyses are aimed to provide new elements to better understand the physics of primary atomization processes. Relationship between flow characteristics in the nozzle and atomization in the near field is one of these elements. The determination of the influence of the surrounding environment on the development of the liquid jet and spray is another one.

**References:**

C. Dumouchel, J.B. Blaisot. Analysis of atomizing liquid ligaments. ILASS – Europe 2014, Bremen, Germany.
C. Dumouchel, J.B. Blaisot. Multi-Scale Analysis of Liquid Atomization Processes and Sprays. ILASS-Europe 2013, Chania, Grèce.
D. Sedarsky, S. Idlahcen, C. Rozé, J.B. Blaisot. Velocity measurements in the near field of a diesel fuel injector by ultrafast imagery. Exp. Fluids (2013) 54:1451.
S. Idlahcen, C. Rozé, L. Méès, T. Girasole, J.B. Blaisot. Sub-picosecond ballistic imaging of a liquid jet. Exp Fluids (2012) 52:289–298.
C. Hespel, J.B. Blaisot, M. Gazon, G. Godard, « Laser correlation velocimetry performance in diesel applications: spatial selectivity and velocity sensitivity », Exp Fluids (2012) 53:245–264.
N. Fdida, J.-B. Blaisot « Morphological characterization of droplets. Application to atomization of sprays». 13th Int. Symp. on Flow Visualization, 1-4 July, 2008, Nice, France.

**Application and contact:**

The candidate's experience must align with some of the project thematic fields, namely optics, multiphase flows or image processing. A doctoral degree is required and the thesis must have been defended at the time of appointment. Applicants will send a CV and a motivation letter to Dr Jean-Bernard Blaisot.