ECL European CORIA Letter
Décembre 2016
2

Zoom sur... ERC, H2020

L'ERC (European Research Council) est un programme de financement européen H2020, qui a pour seul critère l'excellence scientifique du milieu de la Recherche. Différents types de bourses sont ainsi proposées selon les profils des chercheurs qui candidatent.

1. Starting Grant

Profil

- Avoir eu son PhD 2 à 7 ans avant le 1er Janvier 2016.
- Avoir au moins une publication sans l'encadrant de thèse.
- Pouvoir présenter un dossier solide appuyant ses travaux de recherche (conférences, articles, brevets, prix ...).

Financement

Jusqu'à 1 500 000 € pour une période de 5 ans.

2. Consolidator Grant

Profil

- Avoir eu son PhD entre 7 et 12 ans avant le 1er janvier 2016.
- Avoir mené plusieurs publications sans la participation de son encadrant de thèse.
- Pouvoir présenter un dossier témoignant de son expérience significative dans le milieu de la recherche (publications comme premier auteur, séminaires, brevets, prix ...).

Financement

Jusqu'à 2 000 000 € pour une période de 5 ans.

3. Advanced Grant

Profil

- Chercheurs confirmés qui ont été actifs et prolifiques dans leur domaine de recherche ces 10 dernières années.
- Les candidats doivent avoir de nombreux éléments témoignant de leur excellence scientifique (plus de détails dans le guide ERC).

Financement

2 500 000 € pour une période de 5 ans.

4. Proof of Concept Grant

Complément financier destiné aux titulaires d'une bourse ERC afin de les soutenir dans la mise sur le marché de leur innovation.

Eligibilité

- Les projets ERC en cours, ou qui ont terminé il y a moins d'un an avant la date de l'ouverture de l'appel à propositions.

Financement

Jusqu'à 150 000 €, pour une période de 18 mois maximum (la moyenne étant 12 mois).

Calendrier des Appels à projets

H2020 - Marie Curie
ITN-2017
15/09/2016 au 10/01/2017

INTERREG North West Europe
4e AP - 18/11/2016 au 03/2017

Projets en cours au CORIA

BIOENGINE .. 01/10/2016 - 30/09/2019
Amélioration de l'éfficacité énergétique.

IMUST .. 01/01/2016 - 30/06/2019
Création d'un centre d'expertise sur l'utilisation des sources laser ultra-rapides

Kick-off meeting du projet **NEPTUNE1**, 22/11/2016

Actualité des projets

Kick-off meeting VAVIDEN (28/10/2016)

La réunion de lancement du projet LABEX EMC3 a eu lieu le 28 octobre 2016 au CORIA. Cette réunion a permis d'officialiser le démarrage du projet. Michael Gauding, Emilien Varea et Luminita Danaila ont pu présenter les travaux qu'ils allaient mener sur les deux années de vie du projet.

Pour toute question sur le montage et le suivi de projets européens :

Shirley Le Corre
Bureau 1A04
Tél. 6 36 04

ECL European CORIA Letter

Le point scientifique ...

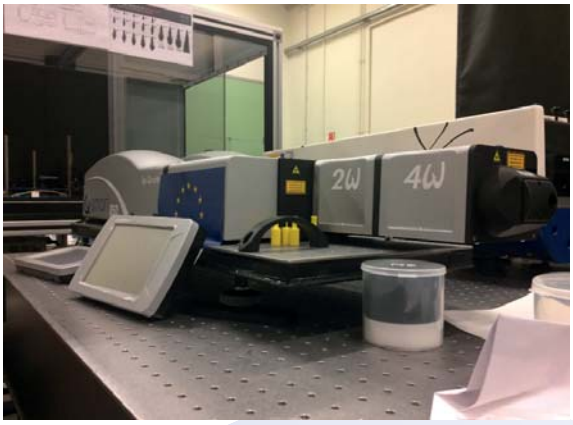
Equipement financé par le fond FEDER
Projet BIOENGINE

Laser PIV double impulsion avec générateur de 4e harmonique

CORIA Lab has just received funds from the **UE ERDF Program** in order to access such kind of simultaneous measurements. A double pulse laser with fourth harmonic generation has been bought. The equipment is the new Q-smart Twins configuration from Quantel. The laser delivers up to two times 380mJ @ 532nm and 120mJ @ 266nm.

From a scientific viewpoint, analyses are focused on thin interface between turbulent jet and counterflow. This is of crucial concern since the thin interface plays a major role in the mixing process. Recent experimental and numerical investigations of the T/NT interface showed the entrainment process to be dominated by small-scale eddies near the T/NT interface (Westerweel et al. 2009). Below a given vorticity magnitude threshold, the flow region is assumed to be the outer irrotational flow. Although this technique has proved its capability, it requires the interface layer to be measured with a sufficiently high resolution so that its statistics are weakly dependent on the threshold value. The problem of the interface layer detection becomes even more stringent when there is turbulence within the outer flow region or in the presence of body forces gradients between internal and external flows.

To investigate this interface which is representative of the emergence of entrainment and turbulent transport, we propose a specific array of 2D optical diagnostics. The velocity fields will be measured by fluorescent f-PIV diagnostics. Whereas the fluorescent f-PIV technique was mainly applied to two-phase flows velocity measurements for obvious reasons related to over illumination of the dense phase with respect to the disperse phase, it brings particular interest in the present study where a separation of the internal and external flows is required. The basic concept of this technic, which was originally developed, by Lecordier and his group at the CORIA laboratory (Kosiwczuk et al. 2005) relies on the seeding both the internal and the external flows with spectrally separated fluorescent particles. Depending on the choice of the fluorescent compound, illumination can be provided either by a one-colour or a two-colour system. The images of fluorescence signals emitted by the particles will be recorded on two opposed identical cameras, each of which equipped with an appropriate combination of filters to separate the desired fluorescence signal from the Mie scatter and the fluorescence signal recorded by the opposite camera.



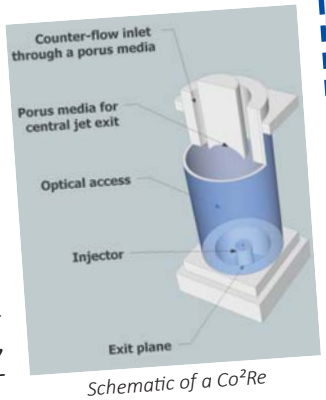
This laser was financed by the ERDF, using 56 100 € of the grant.

Classical PIV processing technic based on cross-correlation computations between pairs of images allows for measuring simultaneously and independently the velocity field of both the jet flow and the counter-flow. The conditional dynamic fields will allow for investigating the contribution of the main/counter-flow jets to the T/NT layer topology.

Because mixing process characterization will mostly depend on the characteristics of the small-scales, a particular attention will be paid to their statistic determination (such as the mean kinetic energy dissipation rate and the mean scalar variance dissipation rate) and thus, to the ability of the experimental set-up to properly capture the smallest scales of both the dynamic and the scalar field.

By Emilien VAREA

The new ANR project **EMCO²Re** deals with **Entrainment and Mixing in COnfined Counterflow Reactors**. In the project, the analysis of the mixing in a CO²Re configuration with variable density jets is proposed. The main jet and the counterflow depict different scalar and dynamic characteristics, which thus require **specific optical diagnostics arrangements. Particle Image Velocimetry (PIV) and Planar Laser Induced Fluorescence (PLIF) need to be set up to provide a simultaneous, detailed** characterization of both the velocity and the active scalar fields. These techniques are robust and have already proved their capability to evaluate the turbulence characteristics of a large range of classical flows, the family of the round jets being particularly well documented.



Schematic of a Co²Re

ECL European CORIA Letter

Portraits

Aqeel AHMED

Projet H2020 HAoS

• Education

Aqeel graduated as Mechanical Engineer (BSc level) from University of Engineering and Technology Lahore - Pakistan, which is the most famous public sector engineering school in the country. He graduated among the top 5% within a class of 180 students. After that, Aqeel worked in an industrial sector for some time. Things changed when he was offered a fully funded Masters level mobility scholarship by Erasmus Mundus (EU grant) to carry out his MSc in Mechanical Engineering from Politecnico di Torino - Italy. Completion of MSc in an international environment really enhanced his understanding and introduced him to higher education in EU.

• Career

Aqeel was working as an intern at IFP Energies Nouvelles in Paris, when he was offered a place as an ESR in the HAoS project. Although he had the possibility to carry out his Ph.D. thesis at some other places, he opted for this collaborative research project which would help to have an impact in the near future, not only on the academic and industrial level, but also on the environment. As a matter of fact, HAoS project is directly linked to increase the fuel efficiency and reduce pollutant emissions from the combustion of liquid based fuels.

Fakhry ABUZAHRA

Projet H2020 HAoS

• Education

Born in Palestine 1988. He pursued his undergraduate study (5-years) in Mechanical Engineering at An-Najah National University in Palestine. After his graduation he was awarded a full scholarship to conduct his MSc. in Turkey at Izmir Institute of Technology supervised by Assist. Prof. Alvaro DIEZ. His Master thesis is titled by: "Experimental Investigation of GDI Injectors". The thesis was part of a project funded by the Scientific Research Council of Turkey "TUBITAK". In that work he quantified the effect of flash-boiling by measuring spatially and globally the spray momentum flux and utilizing high-speed imaging technique using N-Heptane, which is a Gasoline-like, working fluid. All the experiments have been accomplished at the spray labs of the University of Perugia, Italy and supervised by Assoc. Prof. Lucio POSTRIOTI. His work has been successfully published and presented at SAE 2015 conference.

• Career

To continue his passion, he was recruited for the Ph.D. by the CNRS, UMR 6614 CORIA-France as an ESR at HAoS project which is an action of Marie-Sklodovska Curie. In this mission, he will experimentally investigate the primary atomization in Diesel injection under cavitating conditions. His project is titled by "Multi-Scale Analysis of Textural Atomization Processes". Herewith, he will use high speed imaging, ballistic imaging and other tools for velocity measurements. He will apply the multi-scale analysis principle which might help in comprehending the atomization mechanisms as well as providing an equivalent drop size distribution useful for numerical tasks.

Doctorants arrivés sur le projet NEPTUNE 1

Octobre 2016

Romain Canu
Directeur de thèse : François-Xavier DEMOULIN,
Co-encadrant : Benjamin DURET

Jehan DAVID
Directeur de thèse : Pascale DOMINGO
Co-encadrant : Luc VERVISCH

Sushank SHARMA
Directeur de thèse : Abdellah HADJADJ
Co-encadrant : Mostafa SAFDARI

Teddy TAWK
Directeur de thèse : Denis LEBRUN
Co-encadrant : Sébastien COETMELLEC

Contact newsletter : **Shirley LE CORRE**, chargée de gestion de projets européens
02 32 95 36 04 - shirley.le-corre@coria.fr
UMR 6614 CORIA - 02 32 95 36 00 - www.coria.fr
Site Universitéaire du Madrillet - BP 12 - 76801 Saint Etienne du Rouvray Cedex
Conception : Hugues Aroux