

“High speed diagnostics for reacting flows in theory and practice”

May 2nd - 4th, 2023

ISAE-ENSMA, PPRIME Institute

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SCOPE: This training focuses on reactive flow diagnostics fundamentals and applications. More specifically, it will introduce techniques needed to study the physical phenomena involved in the CVC or RDC combustion processes. By introducing the theory and providing the practical experience on specific experimental setups, this training will make ESRs aware of the current measurement capabilities and related uncertainties.

Tuesday May 2nd

9h-9h30: welcome

9h30-11h00: Theory: Visualization techniques: (Chemiluminescence, schlieren, shadowgraphy, BOS)

11h15-12h45: Theory: Laser velocimetry (Laser Doppler Velocimetry and Particle Image Velocimetry)

12h45-13h45: lunch

13h45-14h30: visit of Rapid compression Machine (RCM), ACSEL and RADIUS setups

14h30-16h30: Theory: Spectroscopic techniques: absorption and Planar Laser induced Fluorescence (PLIF)

17h-18h30: Theory: Physical measurements (Pressure, unsteady heat flux, ionisation probe)

Wednesday May 3rd

8h30-9h30: Lecture: laser safety procedure

9h30-12h: Practice 1: 4 groups of 4-5 persons (1 group/topic)

Topic 1: Visualization

Topic 2: Velocity measurement around a cylinder

Topic 3: Hydrogen burner (PLIF measurement)

Topic 4: Detonation tube (unsteady ionization probe and pressure measurements)

12h00-13h00: lunch

13h00-15h30: Practice 2

15h45-18h30: Practice 3

19h30: Dinner in Poitiers center

Thursday May 4th

9h00-11h30: Practice 4

11h30-12h30: Visit: Constant Volume Combustion at PPRIME (CVC and CV2 Setups)

12h30-14h00: lunch

14h-16h: High speed diagnostics application

- Simultaneous High frequency PIV-PLIF for ignition process analysis

- High speed schlieren visualization for combustion regime transition analysis

16h30: end of the training

Registration required: Please confirm your attendance before April 17th 2023 to:
Marc.bellenoue@ensma.fr, Julien.sotton@ensma.fr

Contact for practical aspects: maria-clara.de-jesus-vieira@ensma.fr, choomanee.runnoo@ensma.fr

USEFUL INFORMATION ABOUT ISAE-ENSMA

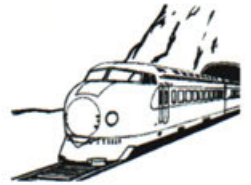
TRAVELLING TO POITIERS AND TO ISAE-ENSMA

Travelling to Poitiers

By train

You can catch a train directly at the SNCF train station at Roissy Charles de Gaulle (CDG) airport in Terminal 2 (a free shuttle service will drop you off there). This train stops at Poitiers train-station.

If no train is available departing from CDG airport, you'll need to go to Gare Montparnasse train station in Paris (to get there, take the RER B local rail service until the "Châtelet les Halles" stop and then take Metro line 4 to "Montparnasse Bienvenue"). The ticket costs approximately €10 and is valid for trips by RER and Metro.



You have the possibility to take a shuttle from CDG airport to Gare Montparnasse (<http://www.lebusdirect.com/>). The journey lasts around an hour and it costs around €20.

You can purchase your train ticket in advance online: <https://www.oui.sncf/>. The journey from Paris to Poitiers takes around 1 hour 15 minutes. You can obtain the 12-27 card to benefit from reductions (€49).

It's possible to purchase low-cost tickets at <https://www.ouigo.com/> (watch out for extra fees to be paid for luggage, check first).

In cooperation with the town's higher education schools, the city hall of Poitiers organizes a welcome service at Poitiers train station during the last week of August and first week of September. If your train arrives between 10 AM and 8 PM, go to the main hall of Poitiers train station where you'll find two tutors with yellow T.Shirts. They'll give you a welcome bag containing a map of the city, a map of the bus network + 1 free bus ticket and will explain to you how to get to your accommodation. Please contact the International Office for more information.

By car

Via the A10 motorway, Paris is 3 hours 30 minutes away from Poitiers by road (exit 28)

→ The motorway tolls cost around €30.

Via the A10 motorway, Bordeaux is 2 hours 30 minutes away from Poitiers by road (exit 29)

→ The motorway tolls cost around €20.



It's easy to park on the Futuroscope campus. However, parking in Poitiers city centre is difficult and expensive! Keep this in mind if you plan to live in Poitiers.

You can also try car sharing!

<https://www.blablacar.fr/>

<http://www.co-voiturage.fr/>

By coach

- The EUROLINES coach company operates services to Poitiers departing from many European cities. The coach will drop you off next to Poitiers train station. You'll then need to take bus no.1 to get to ISAE-ENSMA (get off at the "Universités" stop). <http://www.eurolines.fr/fr/>
- The SNCF has a low-cost bus company <https://www.oui.sncf/bus>
- <https://www.flixbus.fr/>
<https://www.isilines.fr/?kard=1&gclid=CKvg063BktMCFc5sGwodxI0BNg>



Getting to ISAE-ENSMA

The SNCF train station in Poitiers is about 30 minutes by bus from ISAE-ENSMA (line 1 or line 1E). There is a SNCF train station at the Futuroscope, but please note that you'll need to take a taxi from there as there are no buses between this train station and the school.

To find out more about the bus network and the prices, please visit the following website <http://www.vitalis-poitiers.fr/>

Make sure you arrive during the opening hours of the university halls of residence to be able to get access to your accommodation on the day you arrive (after making an appointment online).

ISAE-ENSMA's opening hours

Opening hours of the main entrance: from Monday to Friday from 8:30 AM to 12:15 PM and from 1:30 PM to 5:15 PM.

Access via access card: from Monday to Saturday from 7:30 AM to 9 PM (buildings A and B)

Opening hours of the computer rooms: from Monday to Saturday from 8 AM to 7:30 PM (the computer rooms are located in building B – rooms B025 to B028b, B032, B032b, B034, B037, B037b, from B301 to B305, B309, B372, B373, B460)

Opening hours of the library:

Monday, Tuesday and Thursday from 8:15 AM to 7 PM

Wednesday from 9 AM to 7 PM and Friday from 8:15 AM to 4 PM

Photos and Maps





If you arrive outside the opening hours of the halls of residence or the school, you'll probably have to spend your first night in a hotel.