Lectures on 14.06.2023 in Bergamo, Italy

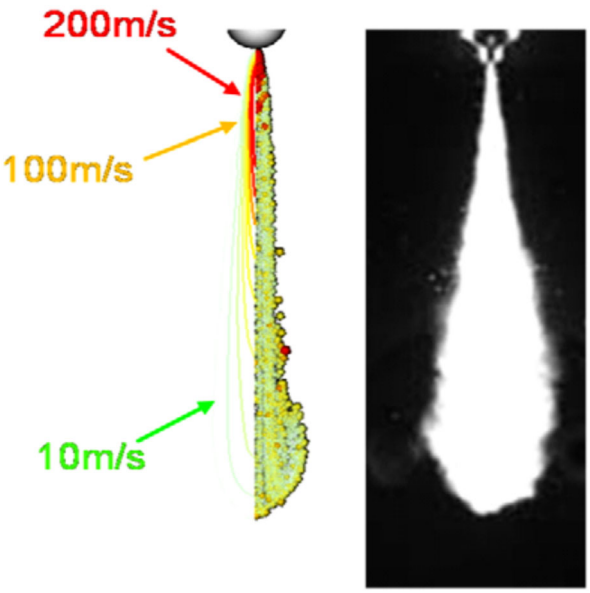
Venue: Università degli Studi di Bergamo, Via Galvani 2, Dalmine, Laboratories, room L101

09:15 to 12:30: Lecture on “Optical Methods in Spray Research” by Prof. A. Coghe

The aim of the presentation is to emphasize the potentiality of the latest advancements of optical experimental methods and their ability to provide numerical simulations with qualitative and quantitative data. The lecture focus is placed on a synthetic overview of the classical and the most commonly adopted experimental methods and techniques in Spray research, followed by a more detailed discussion of the available more recent methodologies and some examples of successful comparison between experiments and numerical predictions.

The work is organised as follows: a short introduction with the classification of optical methods and basic optical concepts. A second part devoted to the Imaging Techniques commonly applied in the spray experimental studies, such as the Path Integrated Measurements: Shadowgraph, Schlieren, SLIPI and Ballistic Imaging. Laser sheet drop sizing will be also introduced together with the methodologies for the separation Vapour/Liquid in Sprays through simultaneous Mie scattering and Laser Induced Fluorescence.

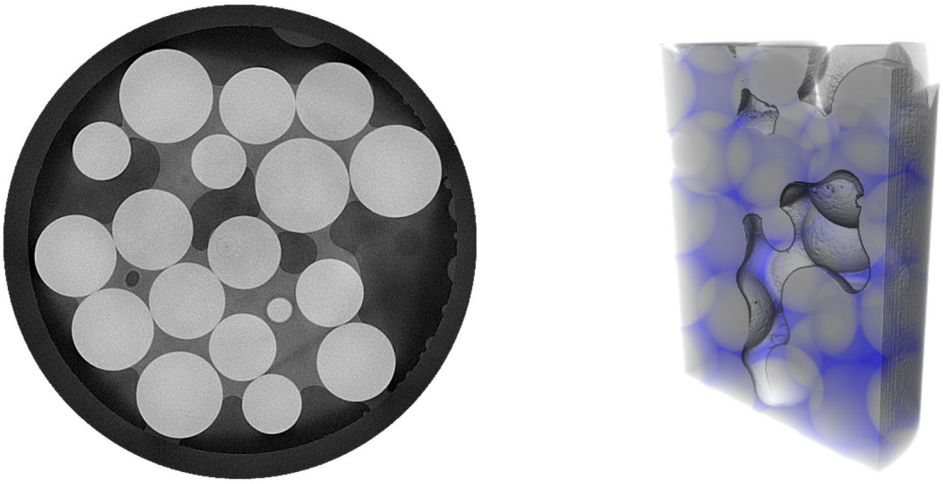
The third part is devoted to the quantitative flow visualization: Particle Tracking and Particle Image Velocimetry. The basic principles and historical developments are outlined, followed by developments of Tomographic PIV and peculiar applications to Engines and Sprays. The main application issues in complex environments, such as sprays and two-phase flows are also addressed. Finally, the novel developments such as the Lagrangian Particle Tracking and Machine-Learning for PIV are introduced to mention the latest evolution of the visualization methodologies.



Comparison between Mie image and predicted structure of non-evaporating spray.

14:00 to 16:30: Lecture on “Fundamentals of X-ray experimental techniques” by Prof. M. Santini

The objective of the course “Fundamentals of X-ray experimental techniques” is to provide an introduction to the X-ray analysis techniques, with a specific focus on radiography and tomography. The course will include the fundamental interactions between radiation and matter, a description of the main instruments to generate and detect X-rays, the typical X-ray micro computed tomography (microCT) facility and a presentation of the figures of merit for the evaluation of the images. The course will conclude with a brief introduction to some challenging experiments related to multiphase flows and droplets.

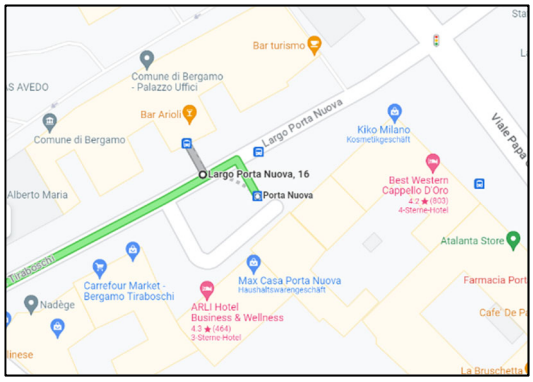


Disordered sphere packing containing 2 fluids during evaporation analyzed by microCT.

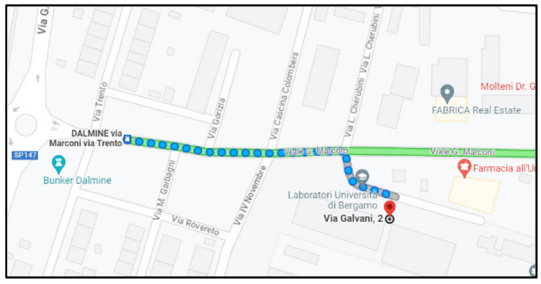
How to get to Dalmine?

Public transportation:

- Take bus no. 5 at the bus station in front of the Arli Hotel (opposite side of road)



- Exit bus about 45 minutes later at stop “Dalmine, Via Marconi, Via Trento”; walk about 2 minutes back to “via Galvani 2”



If you come **by car**, you can park, e.g., here: https://goo.gl/maps/hwZwefemmEAmjSVR6