

IMFT FLUID MECHANICS INSTITUTE, TOULOUSE

IMFT - UMR 5502,
University of
Toulouse, CNRS,
Toulouse INP, UPS
GEMP group
Interface group
PSC group

Fields of application
Engineering (energy, processes, raw
materials...)
Nuclear and petroleum engineering
Aeronautics, transportation and space
applications
The environment
Health

Research themes and know-how

STUDY GROUP ON POROUS MEDIA (GEMP)

Transfers in reactive media (chemistry -
biochemistry)
Multiphase flow, phase changes
Transfers in geological settings
Modeling and scale changes
Effects of confinement, poromechanics

INTERFACE GROUP

Bubbles, drops and moving bodies, dispersed
flow: agitation, mixing and interface
dynamics
Transfer, phase change and reactive
interfaces
Vortices, turbulence and interfaces
Capillary flow and wetting

PARTICLES, SPRAY & COMBUSTION (PSC) GROUP

Sprays, turbulent combustion and
thermoacoustics
Transfers and reactions in turbulent
dispersed flow
Dense and reactive granular media
Transfers, flow and biological suspension

Modeling and numerical simulation

Experiments and local analysis of coupled phenomena

Scale changes

Multiscale/multiphysics approaches and statistical analysis

Main equipment

STUDY GROUP ON POROUS MEDIA (GEMP)

Simulation of reactive flow in porous media (multiscale)
 Fabrication of model porous media: microfluidic, micromodels, Hele-Shaw, dual media
 Characterization of real or model media: 2D and 3D imaging (image visualization and processing, X-ray tomography)
 Measurement of effective properties (permeability, tortuosity, effective diffusion coefficients, sorption)
 Darcy-scale experiments (instrumented columns, two-dimensional mock-ups)

INTERFACE GROUP

Visualization and analysis of high-frequency images (shadow method)
 Measurement of 2D and 3D velocity fields (10 Hz to 100 Hz, High speed particle image velocimetry (PIV))
 Characterization of turbulent transfer and transport, scalar mixing (PLIF)
 Contact angles and rheological properties of interfaces
 Convective boiling in microgravity and transient boiling with high heat flux
 AFM-based nanometric measurements in the vicinity of a triple line

PARTICLES, SPRAY & COMBUSTION GROUP

Laser Doppler Anemometry and velocity fields (PIV)
 Spray measurements (droplet size and velocity) by Phase Doppler Anemometry
 Gas concentration measurements by laser-induced fluorescence (LIF - PLIF)
 Acoustic and thermal measurements
 Computation codes for CFD (combustion, dense and reactive two-phase flow)

Partnerships

Industrial partnerships: AIRBUS, AIR LIQUIDE, AREVA, Astrium, Burgeap, BlueStar, EDF, Pierre Fabre, INEOS, Saint-Gobain, SNECMA, ST Microelectronics, TOTAL, VEOLIA

Institutional partnerships: CEA, CNES, ESA, IFP-EN, INSERM, IRSN, ONERA, ANDRA, BRGM, CHU Toulouse, CSTB, INERIS

Spearheaded by



IMFT in figures



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