Particle-tracking (Lagrangian) simulation with *Code_Saturne*

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Introduction

Code_Saturne can simulate particle- and droplet-laden flows with a Lagrangian approach.

Standard set-up is available through the GUI, steady or unsteady, boundary or volume statistics can be produced.

Since version 3.0, particle-tracking simulations can be run in **parallel** mode and with **periodic** boundary conditions.

Physical modeling

- Drag force and gravity are simulated

- Particle turbulent dispersion with a **Langevin** model (which can be deactivated in the absence of RANS turbulence model for the fluid phase)

- Brownian motion modeling for colloidal particles simulation

- Frozen field, one-way or two-way coupling for velocity, temperature and turbulence

A validation test-case: the particle-laden wall jet

A turbulent particle-laden wall-jet using two-way coupling is part of the *Code_Saturne* validation database
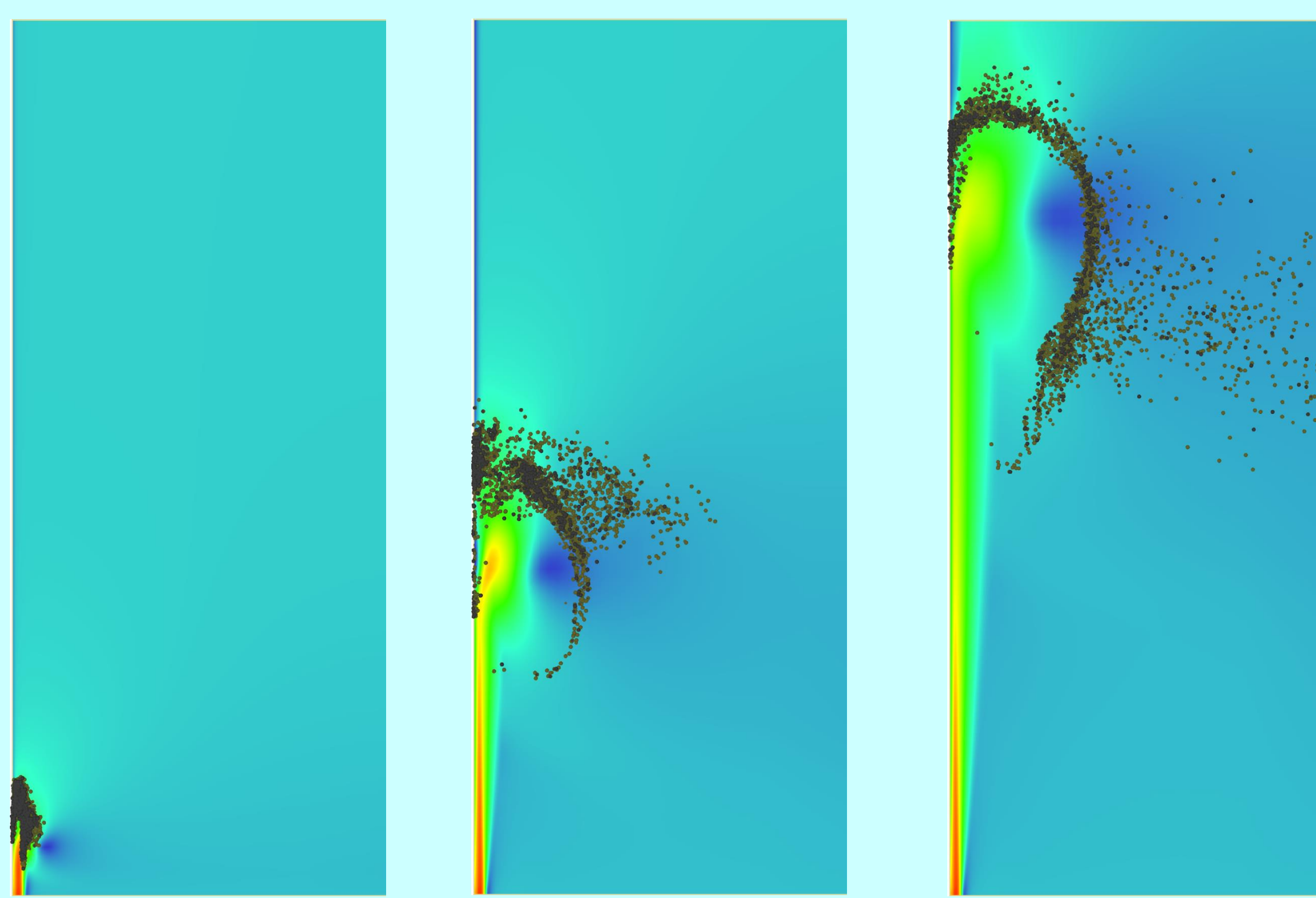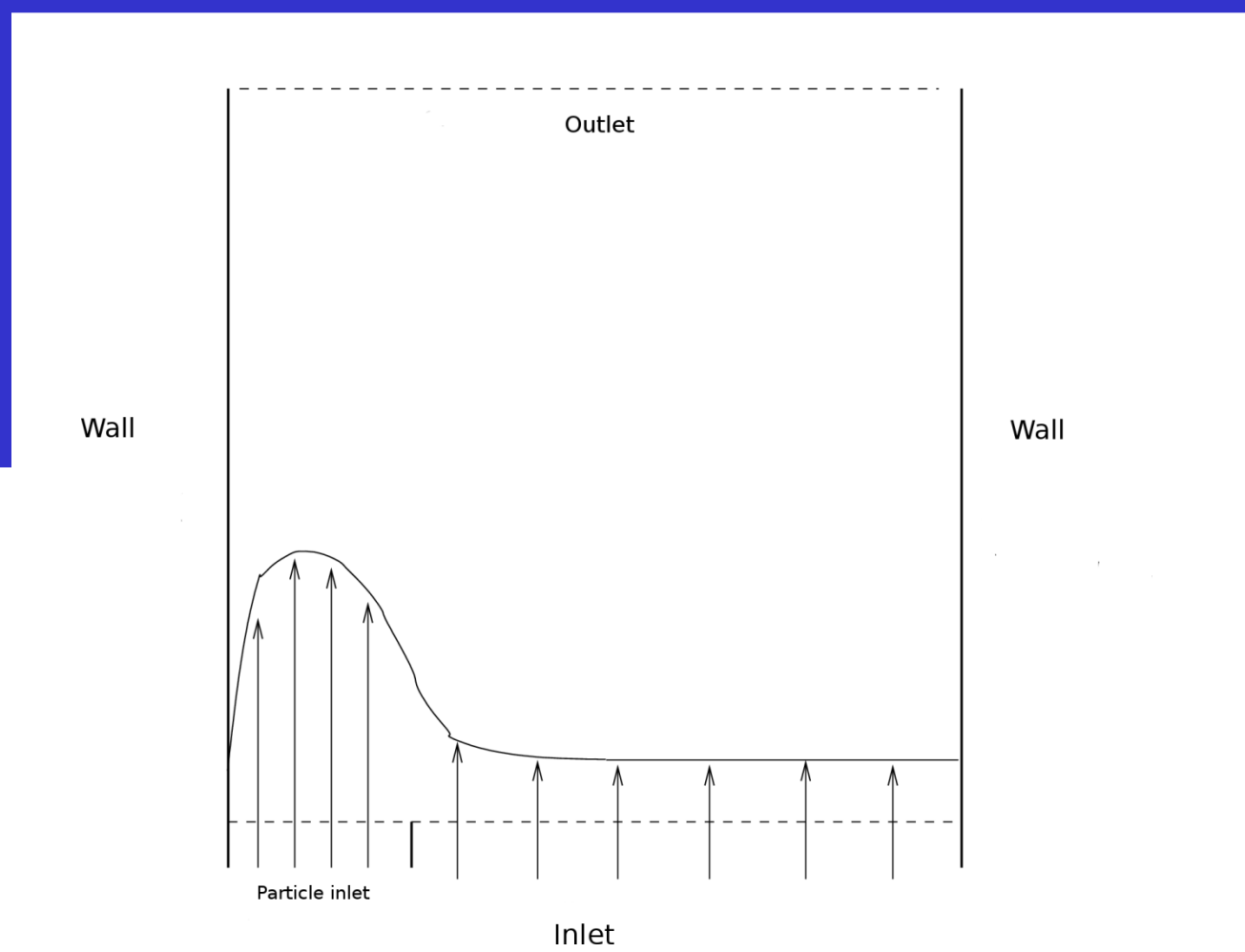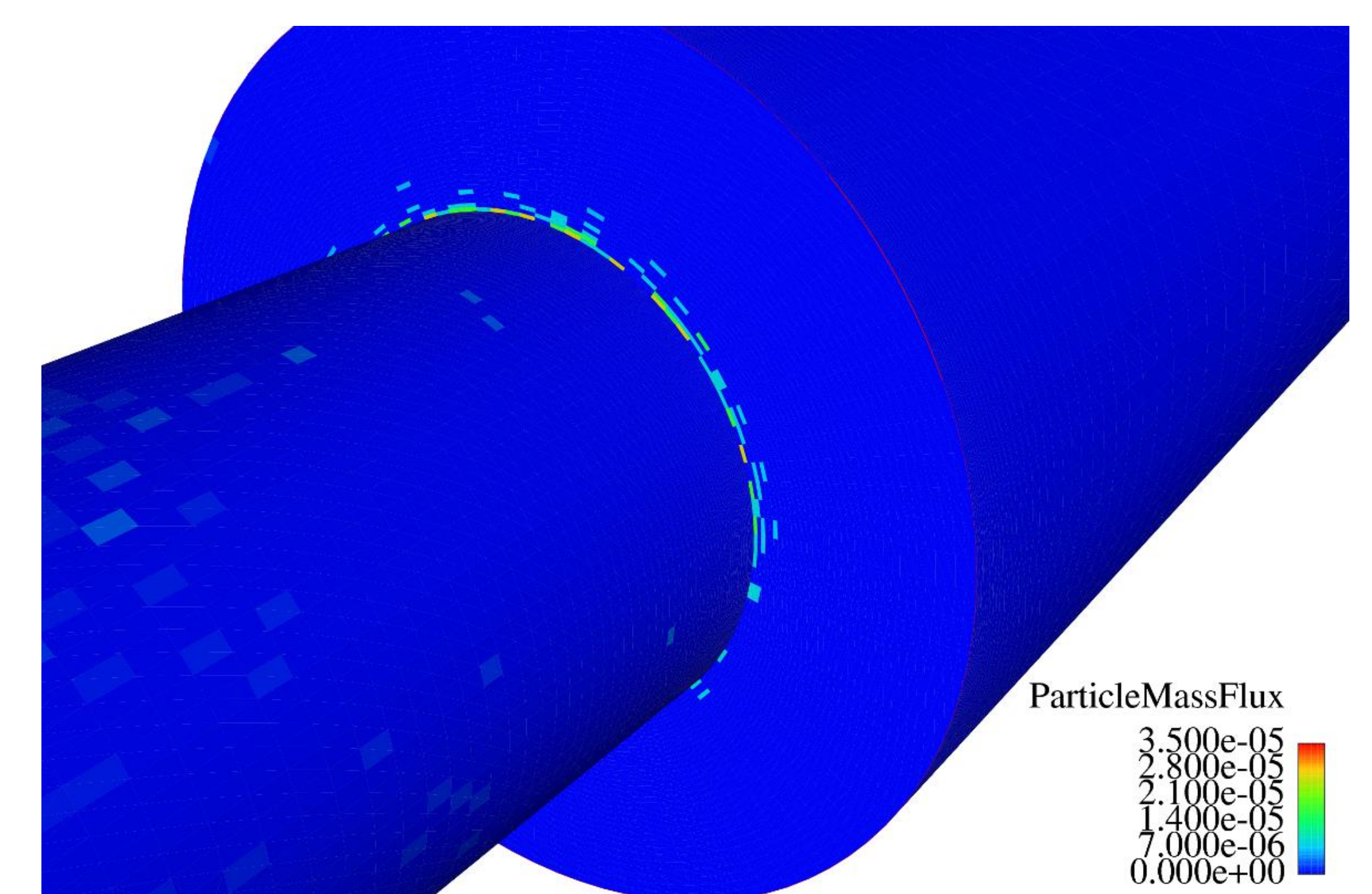

Successive views of the air-flow velocity field and of the first 5000 injected particles of the transient phase of the particle-laden wall-jet test-case
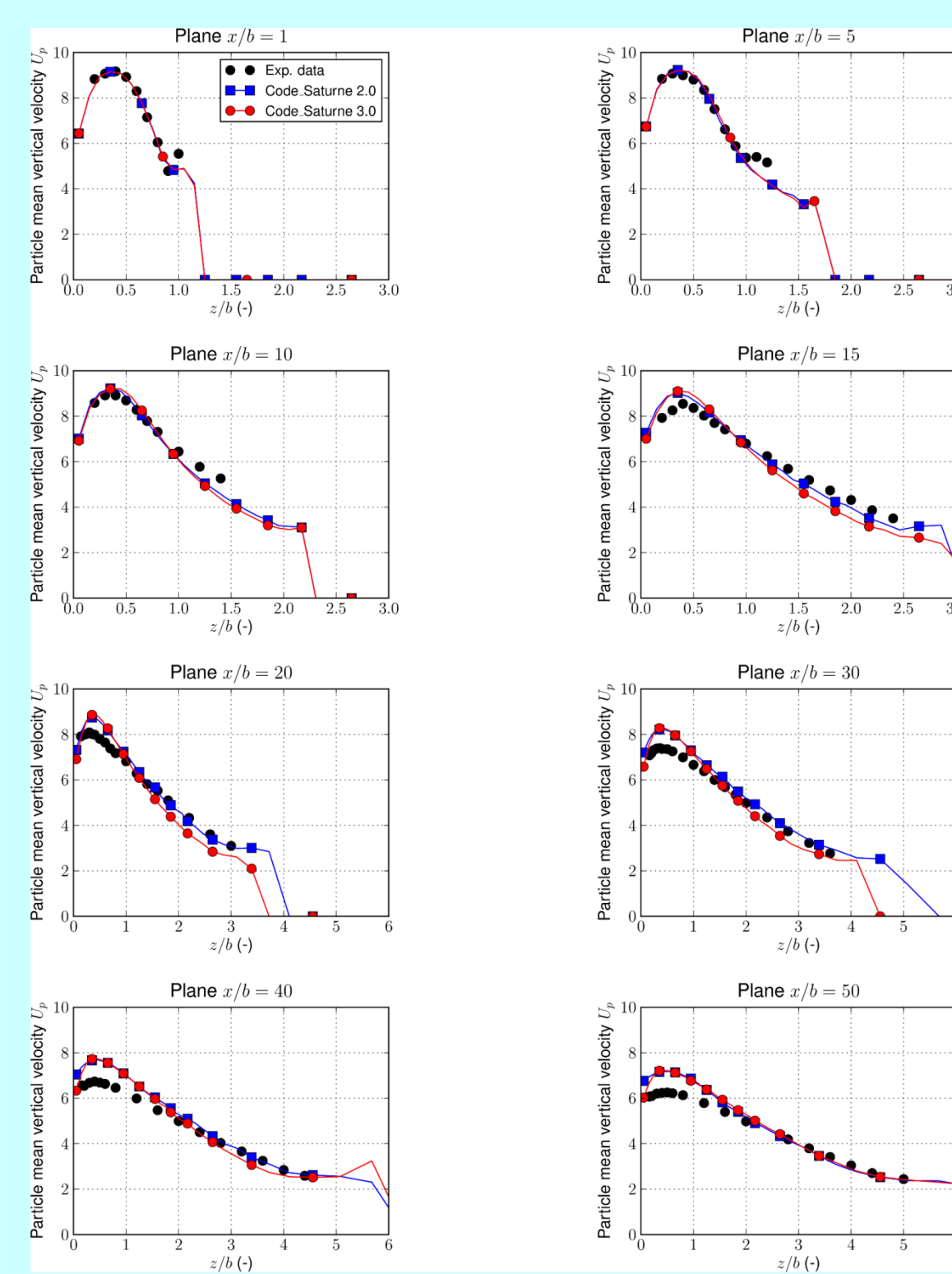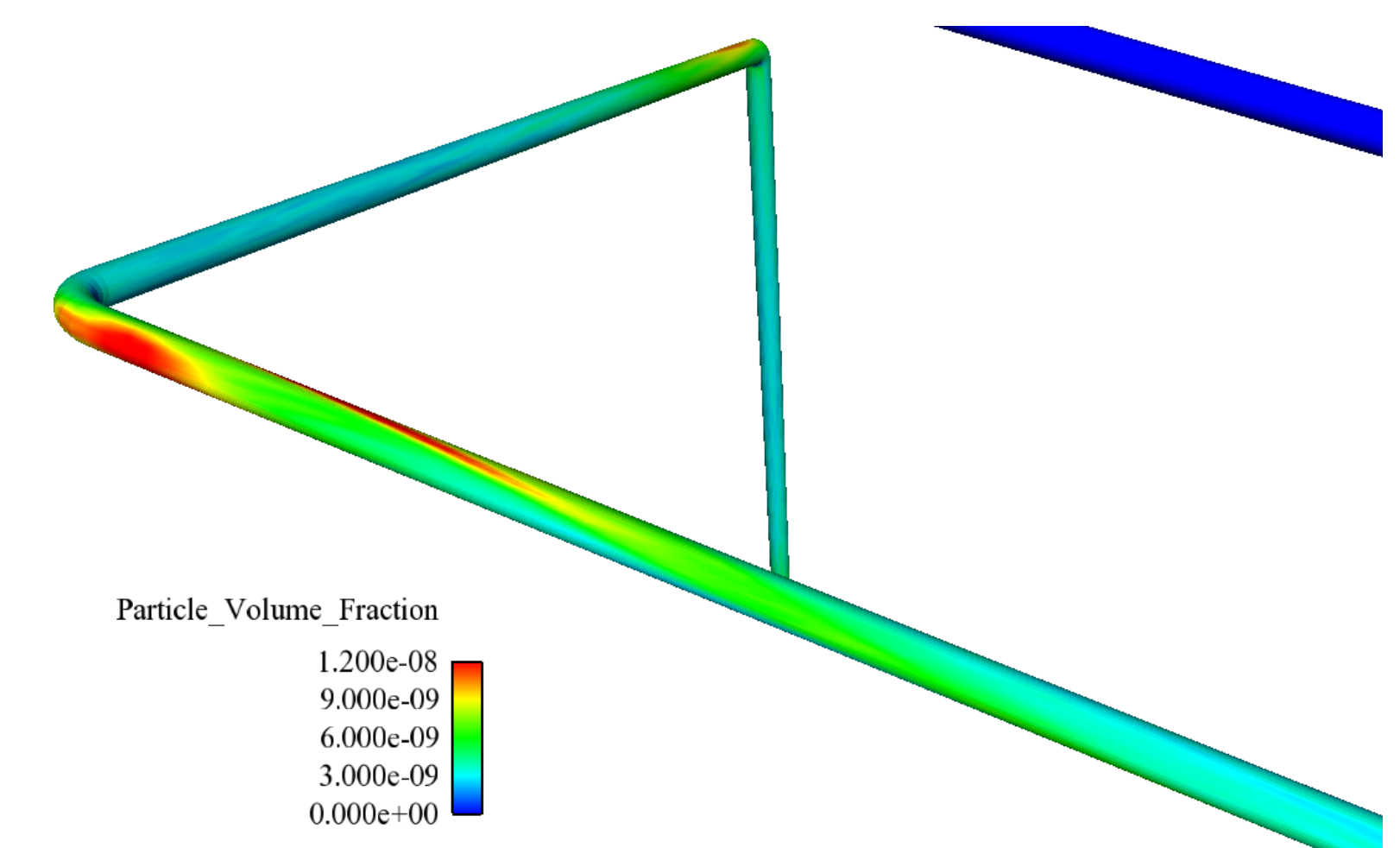
Particle mean velocity vs. experimental data

Particle deposition modeling

A current axis of research at EDF R&D through the MOFPHET-C project

Simulation of the EMILIE experiment (AREVA) devoted to the study of the blocking phenomenon

Simulation of the FORTRAND experiment (EDF R&D) devoted to the study of the fouling phenomenon

Forthcoming

Available in an upcoming version of *Code_Saturne*:

- Particle agglomeration

- Particle resuspension [Henry et al., JCIS, 2011]

Acknowledgments

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