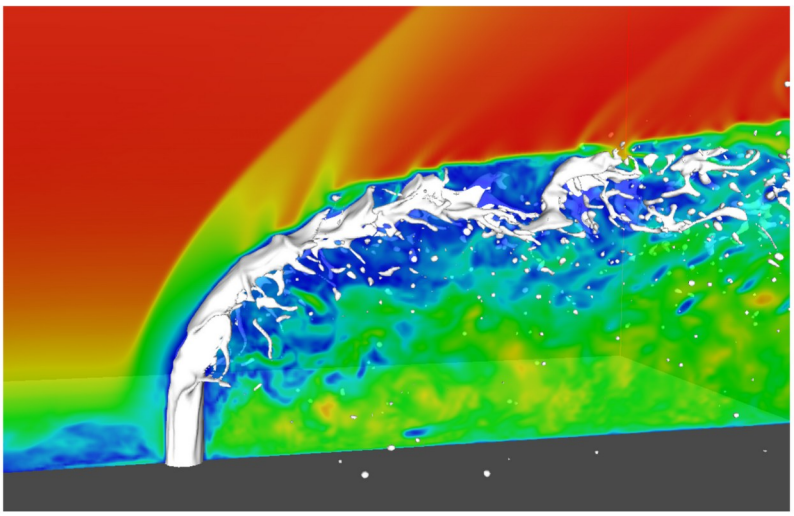
Postdoctoral fellowship – ∂'Alembert lab, Paris

Liquid metal atomisation in compressible flow



View of a liquid jet in supersonic cross flow (from reference [1])

Duration : two years
Start date : First semester 2021
Salary : depends on prior experience and seniority
Location: Institut Jean Le Rond ∂'Alembert, Sorbonne Université, Paris, France
Scientific Leaders : Stéphane Zaleski, Pascal Gardin, Juan Manuel Martinez

Context: Numerical simulation of multiphase flows using VOF and adaptive octree methods has been intensely investigated in the ∂'Alembert laboratory. Atomization of a liquid by a high velocity gas stream can be investigated with impressive detail using the Basilisk code. A High Performance Computing environment can be used in order to attain a reliable prediction on the size , velocity and shape of the largest droplets, which are key to the understanding of the industrial process of powder formation. The compressible version of Basilisk is also available to analyze academic or industrial cases, including shock waves as in the Figure above. Heat transfer from the largest droplets is of interest and could be modelled using correlations for convective and radiative heat transfer from particles. Experimental reference data will be available.

Eligibility : The candidate is expected to have prior experience in multiphase flow simulation, preferably in HPC environments.

References:
[1] Kuhn, M., and O. Desjardins. "Analysis of a Liquid Jet in Supersonic Crossflow Using Large-Eddy Simulation." *Proc. ILASS-Americas Conf*. 2019.
[2] Zhao, Jiafeng, et al. "Simulation of a liquid jet in supersonic crossflow by a hybrid CLSVOF-LPT method." *Acta Astronautica* (2021).