



**UNIVERSITÀ  
DEGLI STUDI  
DI BERGAMO**

Dipartimento  
di Ingegneria  
e Scienze Applicate

# Direct Numerical Simulation (DNS) of Primary Jet Break-up

**Prof. Bernhard Weigand**

Faculty of Aerospace Engineering and Geodesy, University of Stuttgart, Germany

**Visiting Professor within STaRs Programme and DRoPIT Project**

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Università degli Studi di Bergamo, Dipartimento di Ingegneria e Scienze Applicate  
viale G. Marconi 5, I-24044 Dalmine (BG), Italy

## ABSTRACT

Primary jet break-up is a process, which is of great importance in a large number of technical applications, ranging from particle generation, fuel injection in gas turbine combustion chambers, to firefighting or medical applications like inhalers. A detailed understanding of these processes can be obtained for example by experiments. Another way to obtain a deep insight in the processes involved in primary jet disintegration is possible by using very detailed numerical simulations, like direct numerical simulations. For such calculations the grid resolution has been so fine that smallest length and time scales in the flow are resolved. This requires normally the usage of supercomputers for these type of calculations.

The present lecture aims to give an introduction into what is needed to carry out such direct numerical simulations, e.g. conservation equations and numerical methods, as well as parallelization methods will be described. The lecture will also talk about necessary validations for DNS of primary jet break-up, which are indispensable in order to trust later the highly expensive numerical results. At the end of the lecture it will be shown what types of calculations are feasible today



*DNS of the primary jet disintegration of a jet consisting of a shear thinning fluid*

**Ph.D. students of ISA and TIM Doctorates are specially invited**

**Ref. Prof. G.E. Cossali, [gianpietro.cossali@unibg.it](mailto:gianpietro.cossali@unibg.it)**