OTTO VON GUERICKE UNIVERSITÄT MAGDEBURG

WORKGROUP FOR MULTIPHAS FLOWS

Generalized modelling of droplet collisions in the frame of Euler/Lagrange calculations

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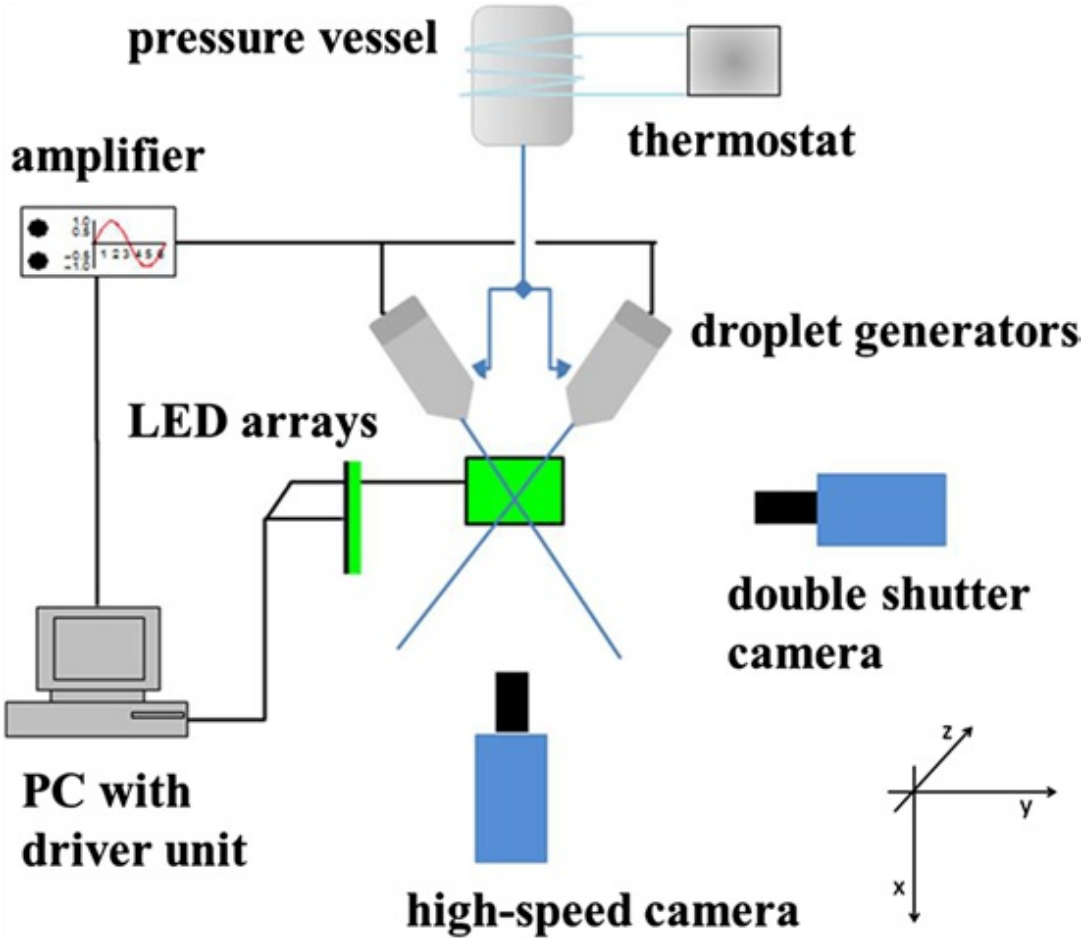
Spraying systems have a huge importance for a number of technical and industrial processes as well as in daily life. Exemplarily few of such processes are summarized: spray combustion in automotive engines and stationary turbines, spray drying of solutio or suspensions being relevant for different industrial areas (e.g. food production, pharma industry, material science and detergen production), spray cooling of surfaces and spray painting. Essential in all these processes is the atomization of the liquid by certa nozzle types for yielding a desired size spectrum of the formed droplets. As to be expected there are numerous elementary processes influencing this size spectrum such as liquid fragment breakup, droplet breakup and droplet collisions. Over the last decades CFD (computational fluid dynamics) became more and more of importance for the design, lay-out and optimization of these rather complex two-phase flows. For sprays with large importance of the droplet size distribution expectedly the Euler/Lagrange approach is most feasible. In order to analyze the effect of droplet collisions in spray, numerical simulations with fully stochastic collision model are being carried out by using open source code OpenFOAM® that are based on the Euler-Lagrange approach. And the experiments of binary droplet collision are conducted in order to get the We-B collision map to distinguish the collision outcomes which is critical in numerical simulations.



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