



# DROPLET IMPACT CHARACTERIZATION BY HIGH-SPEED SHADOWGRAPH IMAGING AND TOTAL INTERNAL REFLECTION TECHNIQUE

Álvaro Campos Araya, Thermosciences and Fluid Mechanics, [afc.araya@usp.br](mailto:afc.araya@usp.br)  
Luigi Paero Leitão, Thermosciences and Fluid Mechanics, [luigi.leitao@usp.br](mailto:luigi.leitao@usp.br)  
Arthur V. S. Oliveira, Thermosciences and Fluid Mechanics, [avs.oliveira@usp.br](mailto:avs.oliveira@usp.br)

**Abstract.** *The main objective of this research is to study the phenomenology of single droplet impact on a heated surface and how this is affected by the variation of parameters such as the droplet impact velocity. To achieve this goal, this study proposes the combined use of high-speed cameras and optical techniques, specifically Total Internal Reflection (TIR) and High-Speed Shadowgraph (SDG). TIR provides an impact's bottom view and it can be used to estimate the contact area between the surface and the fluid. SDG provides a side view of the impact and it can be used to estimate droplet size and impact velocity. Then image processing is applied to estimate the mentioned parameters. Simultaneous application of both techniques allows to study the hydrodynamics during and after impact. This is a major breakthrough for the research of more complex processes in the future like sprays.*

**Keywords:** *High-speed imaging. Optical techniques. Image processing. Sprays.*