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Student thesis subject: Experimental analysis of a multiphase jet

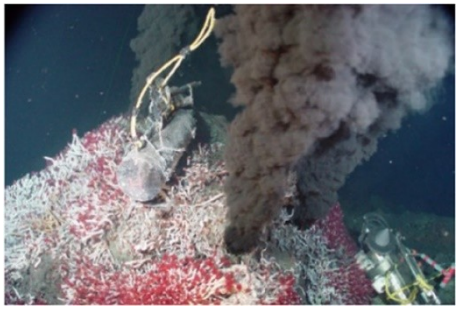
A multiphase jet is the ejection of a fluid, in which different particles, bubbles and droplets are finely dispersed, from a small orifice. Examples of such systems are the ash clouds of volcanos, the liquid droplets from a spray can or the injection of bubbles in an underwater ramjet engine.

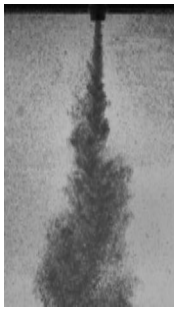
Liquid jets with bubbles or particles have already been investigated experimentally for decades. However, there a no studies about their combined effect in a 3-phase jet with bubbles and particles. Such systems are among others relevant for certain forms of the flotation method, which is used to extract metals from most ores mined nowadays.

The thesis subject includes…

- the characterisation of the water, bubble and particle movement using optical measurement methods (particle image velocimetry and particle tracking velocimetry).
- a parameter study on the influence of the individual volume fluxes as well as bubble and particle sizes on the behaviour of the jet.
- the further development and optimisation of the experimental set-up and the measurement procedure.

The work will be performed at the Helmholtz-Zentrum Dresden-Rossendorf (HZDR).

(a) 

(b) 

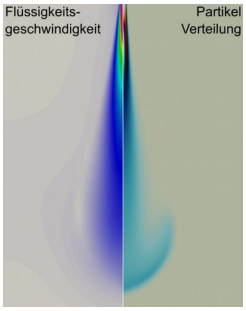
(c) 

Figure: (a) Hydrothermal vent in the deep sea [1]. (b) 2-phase jet of bubbles in water [2]. (c) Numeric simulations of a liquid jet with particles [V. V. Kamble].

[1] Y. Chen et al., River **1**(2), 207–220 (2022)
[2] M. Veit, Untersuchung eines 2-phasigen Freistrahls in einer Flotationszelle (2020)

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