Response to Reviewer 2 Comments

Dear Reviewer,

Thank you for your helpful comments. We considered them and changed the document as following:

Point 1: It would be very interesting to know the authors' views on how realistic the prospect of implementing their methods is, bearing in mind their competitive ability compared to existing methods, which might be simpler and more effective. I think that short enough estimations would be very useful and could increase the significance of the work.

A detailed overview of available techniques and their drawbacks are detailed described in L48-L92. The measurement principle of the telecentric shadowgraphic probe is detailed described in section 1.2, L104-164, also considering advantages and disadvantages (for example increased space requirement). Nowadays, in industry 4.0 more sensors are implemented giving insight to more local process details. So in process industry besides P and T, sometimes concentration are measured, but maybe other features, like particle size distribution, may be of interest.

We added a detailed report about a project covering a comparison between a commercial available probe to the literature and added the following sentence in L164:

"A detailed comparison between this technique and a commercially available probe for droplet detection can be found elsewhere [47]."

Becker, K. et al. (2019), Abschlussbericht;

Point 2: The authors' competent opinion on the prospects of applying their approach in other fields of knowledge, for example, in the method of liquid membranes in the crushing of droplets of immiscible liquids, or for the study of bubbles from a mixture of vapour and gas during cavitation, etc. is also very important. If there are original fruitful ideas on this subject, it would be very appropriate to mention this in the introduction or conclusion. In my opinion, this would significantly increase the interest of readers and the significance of the work done.

The probe has been successfully tested also with crystallization, bubble and extraction columns, phase separation in gravity settlers, entrainment in distillation and absorption columns and detailed literature covering the applications and are described in L145-149. Nevertheless, we added the following sentence to provide the reader with possible applications and projects for the future in L421-424:

"Possible future applications are manifold, like the detection of cavitation bubbles, the measurement of bubbles in jet-loop-reactors or the use in fixed bed reactors for the characterization of the flow regime to name a few."

Point 3: The practical application of new methods is always accompanied by certain difficulties and costs. Can the authors assess the advantages and disadvantages of the approach they are developing in terms of comparison with existing practical technologies? A brief remark would be very useful to interested parties.

This question is difficult to answer, since this is a scientific approach. Calculations or concrete comparisons in the field of commercial measurement techniques have not been made so far. Until now, there are just scientific comparisons as mentioned above.

Thank you for the ideas and honest questions!