

Peer Review

Review of: "Detecting Turbulent Patterns in Particulate Pipe Flow by Streak Angle Visualization"

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This study introduces a streak visualization technique that is significantly simpler and more affordable than established methods, making it highly accessible for both research and industrial applications where expensive setups are not feasible. Furthermore, the validation of the experimental results with established methods bolsters the credibility of the work. However, I have a few points that I believe would enhance the clarity and rigor of the manuscript.

(1) The caption for the table should be placed at the top, in accordance with standard formatting conventions. Additionally, in the second-to-last line on page 4, the sentence "while the extensive data they deliver makes..." appears incomplete. Also, the bracket is missing in the last paragraph of Section 2 on page 5.

(2) The manuscript mentions the use of glycerol mixed with water, but the purpose of this addition is not clearly explained. The authors should provide a more detailed explanation of why glycerol was used in the fluid mixture. Furthermore, while the study focuses on the transition from laminar to turbulent flow, it would have been helpful for the authors to compare and characterize the flow dynamics before introducing the tracer particles. This comparison would help clarify any potential influence that the tracer particles might have on the fluid phase. Many studies have shown that particle-particle interactions can play a significant role in initiating turbulence within multiphase flow systems. Since the volume fraction of the tracer particle is low, this may not be the case in this study. Therefore, I suggest that the authors provide the rationale behind the selection of the particle volume fraction (0.12%).

(3) While the current study provides valuable insights, additional experiments under different fluid conditions, such as varying viscosity, particle size, density, and concentration, could help validate and

generalize the findings. Although this is not strictly necessary, it would be better to mention it as a limitation of the experiment in the paper.

(4) Given the importance of precision in image processing and flow characterization, it is crucial to quantify and communicate the uncertainty associated with the experimental results. The authors should include a detailed explanation of the uncertainty in the measurements. For example, the authors have not explained how the uncertainty in Figure 4 was calculated.

(5) The authors have thoroughly addressed the technical aspects of image processing, which is commendable, particularly in mitigating background noise and artifacts that could otherwise compromise the accuracy of the data. However, it would be valuable for the authors to clarify whether they have compared the results obtained with and without the removal of background noise. This comparison would help elucidate the impact of background noise on the accuracy and reliability of the measurements. Specifically, it would be beneficial to know how significant the noise reduction is and whether the exclusion of such artifacts leads to a noticeable improvement in the precision of the flow characterization. Please address this comment.

Declarations

Potential competing interests: No potential competing interests to declare.