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PARTICLE-LADEN FLOWS IN ENVIRONMENTAL AND HEALTH APPLICATIONS

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ABSTRACT

Particle-laden flows are central to many processes of direct relevance to human health and the environment, including microplastic transport, airborne disease transmission, respiratory flows, and aerosol-based drug delivery. Understanding and accurately predicting particle transport, dispersion, and deposition in such flows remain significant scientific challenges due to the multiscale nature of the underlying physical processes. This minisymposium aims to highlight recent advances in the experimental study, modeling, and simulation of particle-laden flows in environmental and health applications. Contributions employing Lagrangian particle methods, such as point-particle approaches, as well as particle-resolved and hybrid techniques, are particularly welcome. Topics of interest include particle transport in turbulent and transitional flows; transport and deposition in complex geometries, such as the human respiratory system; aerosol dynamics; and multiscale modeling strategies. Both experimental and computational studies, as well as fundamental and application-driven contributions, are welcome. The session seeks to foster interaction among researchers in fluid mechanics, environmental science, and biomedical engineering, and to highlight emerging challenges and opportunities in the study of particle-laden flows relevant to health and the environment.

REFERENCES

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