

# High-Resolution Computational Modelling of Multi-Material Flows

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## **Abstract**

The paper concerns the development of high-resolution methods for variable density flows and the implementation in multi-species flow studies in microfluidics. The high-resolution discretisation is obtained by numerically reconstructing the flow variables using information for the eigenstructure of the system of equations. Three variants of high-resolution methods are presented and their accuracy is assessed against analytic and experimental results for diffusion broadening in microfluidics. Results from numerical convergence studies are also presented to demonstrate the relative efficiency of the three reconstruction variants in conjunction with first, second and third-order of accuracy in spatial discretisation.