Abstract Submitted
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**High-fidelity droplet and bubble simulations using local enrichment**[1] FLORIAN KUMMER, Fluid Dynamics, TU Darmstade — We are going to present a high-order numerical method for multi-phase flow problems, such as droplets or bubbles, which employs a sharp interface representation by a level-set and an extended discontinuous Galerkin (XDG) discretization for the flow properties. The shape of the XDG basis functions is dynamically adapted to the position of the fluid interface, so that the spatial approximation space can represent jumps in pressure and kinks in velocity accurately. By this approach, the '$h^p$-convergence' property of the classical discontinuous Galerkin (DG) method can be preserved for the low-regularity, discontinuous solutions, such as those appearing in multi-phase flows. In realistic droplet setups one observes length scales which may cover several magnitudes. Therefore, in addition to the XDG-enrichment one also requires adaptive mesh adaptation. This refinement is feature-based, i.e. controlled by the local curvature. Our presentation will focus on some of the critical building-blocks of the method and their integration in the full solver.

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