

Abstract Submitted
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LES of cavitation behind a backstep¹ FILIPE BRANDAO, KRISHNAN MAHESH, University of Minnesota — Cavitation in reattaching shear flows is numerically investigated using a backward-facing step configuration, with inflow turbulent boundary-layer of $Re_\tau = 1500$. This turbulent boundary-layer is generated using the recycle-rescale method of Lund et al. (1998). Different cavitation regimes are investigated: from inception to developed cavitation. For inception, we use a novel method that assumes vapor as a passive scalar in an incompressible liquid. In the more developed stages of cavitation, the compressible homogeneous vapor-gas-liquid mixture approach of Brandao et al. (2020) is employed. It is observed that inception starts at the low pressure streamwise vortical structures usually located in the axial position of $0.5 < x/Lr < 0.8$, where Lr is the reattachment length, agreeing well with experimental data. For lower values of cavitation numbers, the cavity shedding process is dominated by the passage of a bubbly shock.

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