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Shock propagation in a liquid containing bubbly clusters HERVE GRANDJEAN, NICOLAS JACQUES, ENSTA Bretagne, STEPHANE ZALESKI, University Paris 06 — The propagation of shock waves in a liquid containing spherical bubbly clusters is investigated. A continuum model for the behaviour of such heterogeneous diphasic fluid has been developed, using a scale transition method. Numerical simulations of shock wave propagation reveal that the presence of bubble clusters has a significant influence on the shock dynamics. It is observed that the structure of the shock is dominated by the global response of the clusters instead of the single-bubble dynamics, as in homogeneous bubbly flow. As a consequence, the wavelength of the shock structure in a liquid with bubble clusters may be much larger than for the corresponding homogeneous bubbly liquid. To assess the accuracy of the proposed continuum modelling, axisymmetric simulations in which the position and shape of the clusters are directly specified were carried out. A good agreement between the two approaches was observed. The results of the proposed model were also found to compare well to experiments of the literature.

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