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Numerical Investigation of Boiling MICHAEL SAGAN, SEBASTIEN TANGUY, CATHERINE COLIN, IMFT — In this work, boiling is numerically investigated, using two phase flow direct numerical simulation based on a level set / Ghost Fluid method. Nucleate boiling implies both thermal issue and multiphase dynamics issues at different scales and at different stages of bubble growth. As a result, the different phenomena are investigated separately, considering their nature and the scale at which they occur. First, boiling of a static bubble immersed in an overheated liquid is analysed. Numerical simulations have been performed at different Jakob numbers in the case of strong density discontinuity through the interface. The results show a good agreement on bubble radius evolution between the theoretical evolution and numerical simulation. After the validation of the code for the Scriven test case, interaction of a bubble with a wall is studied. A numerical method taking into account contact angle is evaluated by comparing simulations of the spreading of a liquid droplet impacting on a plate, with experimental data. Then the heat transfer near the contact line is investigated, and simulations of nucleate boiling are performed considering different contact angles values. Finally, the relevance of including a model to take into account the evaporation of the micro layer is discussed.

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