Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Sliding bubbles on a hot horizontal wire in a subcooled bath[1]
ALEXIS DUCHESNE, CHARLES DUBOIS, HERVÉ CAPS, GRASP- Université de Liège — When a wire is heated up to the boiling point in a liquid bath some bubbles will nucleate on the wire surface. Traditional nucleate boiling theory predicts that bubbles generate from active nucleate site, grow up and depart from the heating surface due to buoyancy and inertia. However, an alternative scenario is presented in the literature for a subcooled bath: bubbles slide along the horizontal wire before departing. New experiments were performed by using a constantan wire and different liquids, varying the injected power. Silicone oil, water and even liquid nitrogen were tested in order to vary wetting conditions, liquid viscosities and surface tensions. We explored the influence of the wire diameter and of the subcooled bath temperature. We observed, of course, sliding motion, but also a wide range of behaviors from bubbles clustering to film boiling. We noticed that bubbles could change moving sense, especially when encountering with another bubble. The bubble speed is carefully measured and can reach more than 100 mm/s for a millimetric bubble. We investigated the dependence of the speed on the different parameters and found that this speed is, for a given configuration, quite independent of the injected power. We understand these phenomena in terms of Marangoni effects.

[1]This project has been financially supported by ARC SuperCool contract of the University of Liège

Alexis Duchesne
GRASP- Université de Liège

Date submitted: 23 Jul 2015 Electronic form version 1.4