

Flow boiling heat and mass transfer in small diameter channels was the subject of intensive researches in recent years. The trend towards miniaturization of devices leads to problems with heat dissipation. Heat exchangers equipped with mini or micro-channels are able to tackle the problems associated with heat transfer from the micro-devices, but are exposed to different types of instabilities. These instabilities disturb the heat and mass transfer thus reducing the efficiency of the heat exchanger and, in some cases, may be the cause of the system failure. The aim of the project is to analyze mechanisms responsible for stability loss during flow boiling in parallel minichannels system contacted in different configurations. For this purpose experimental studies initially on single channel system and then on two minichannel system with different geometrical parameters and differently connected will be conducted. The measurements taken synchronously from pressure and high speed camera will be subjected to nonlinear data analysis techniques in order to determine the dynamics of the investigated system and dynamics of the interactions between channels. During flow boiling inside minichannel different two-phase flow instabilities can be observed. An attempt to distinguish different boiling regimes and flow patterns map (after proper analysis of signal recorded during the experiment) on the basis of recorded data will be made. Numerical simulation will be performed in order to understand processes taking place inside minichannel which can not be measured experimentally. Created numerical model will allow to track interface between liquid and vapour and calculate velocity profiles and pressure distribution inside parallel minichannel boiling system. Experimental and numerical data analysis will increase knowledge of the interactions between boiling minichannels. The reason for engaging in project issues is relationship to the topic of the dissertation during which is the project manager. The wide research abilities provided in project manager laboratory. Our experience in the different techniques of experimental measurement of flow inside minichannel and heat transfer in such systems. Access to expensive research equipment at the disposal of the department of Bialystok University of Technology without which the implementation of tasks set in the project would be much more difficult.