TÉCNICO LISBOA

IN+ CENTER for INNOVATION, TECHNOLOGY and POLICY RESEARCH

Study of boiling mechanisms using biphilic surfaces

Ricardo Cautela

Laboratory of Thermofluids, Combustion and Energy Systems
Center for Innovation, Technology and Policy Research IN+

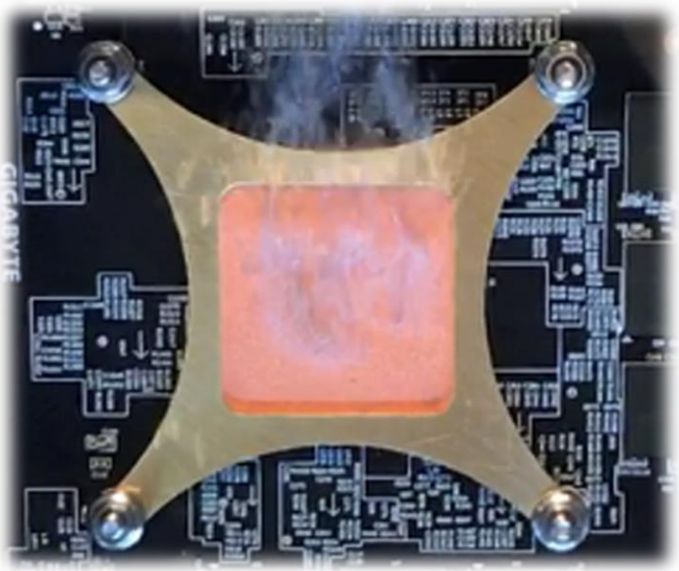
IN+ GET TOGETHER

Supervisor(s): Prof. António Moreira
Dra. Ana Moita

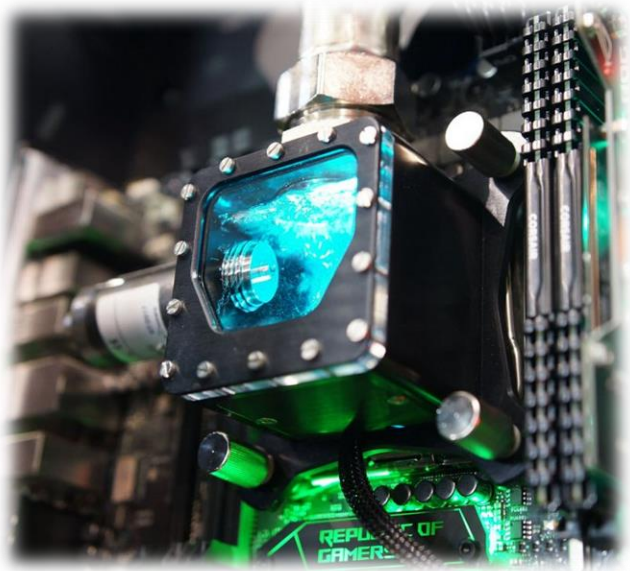
20th September, 2019

Phase Change Liquid Cooling Applications

Developed by Der8auer



Developed by Thermal Solutions

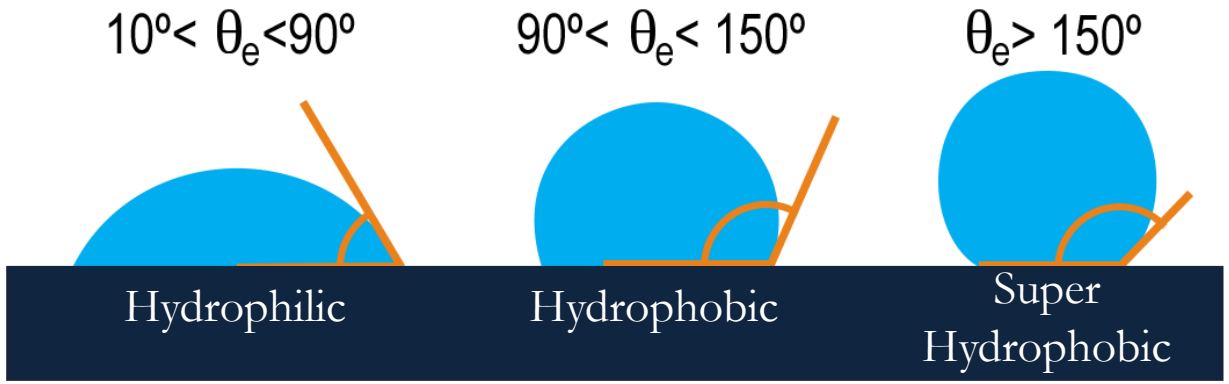


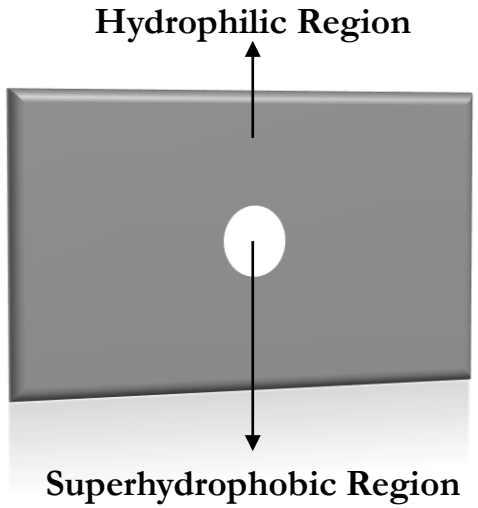
Developed by Der8auer

Biphilic Surfaces

- Biphilic Surfaces are composed of different wettability regimes. In this case the surfaces are hydrophilic with added superhydrophobic spots.

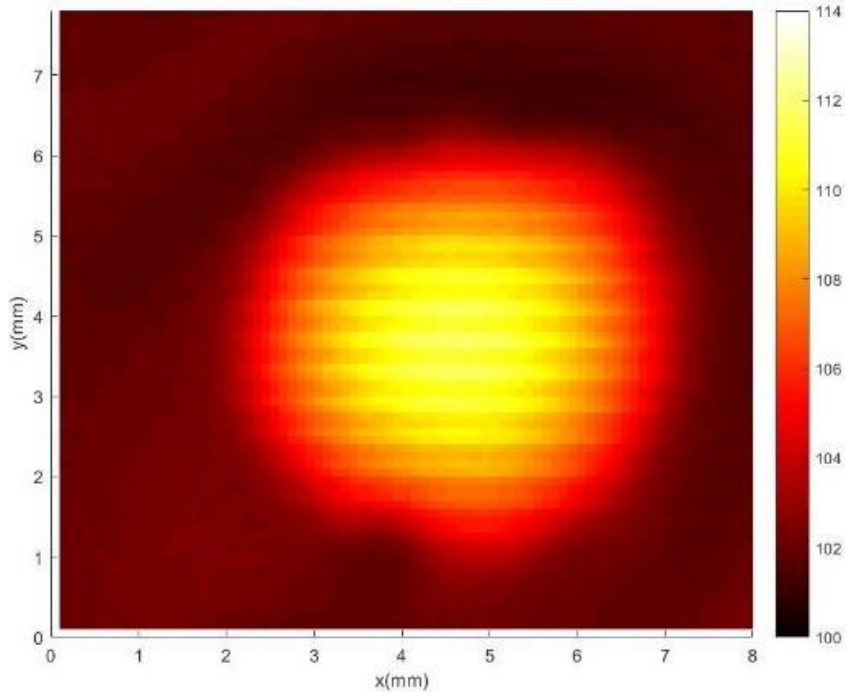
- Superhydrophobic behavior is achieved either by coating or structuring.

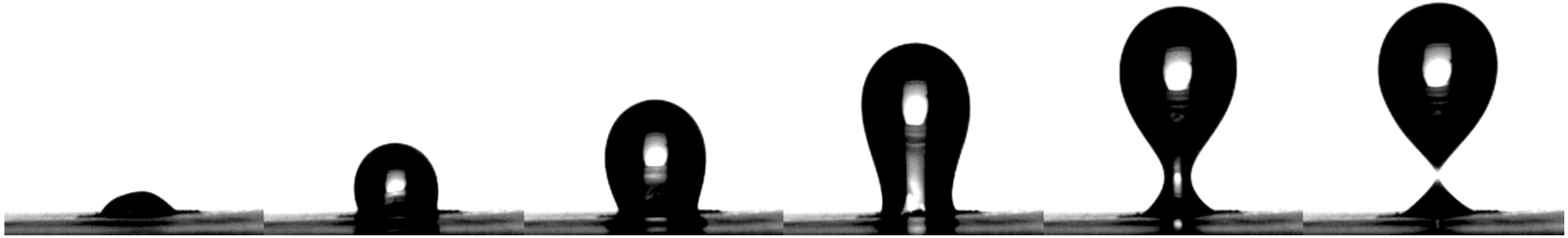




Main Objectives

- Studying single bubble dynamics on biphilic surfaces
- Analyzing the biphilic surface temperature distributions

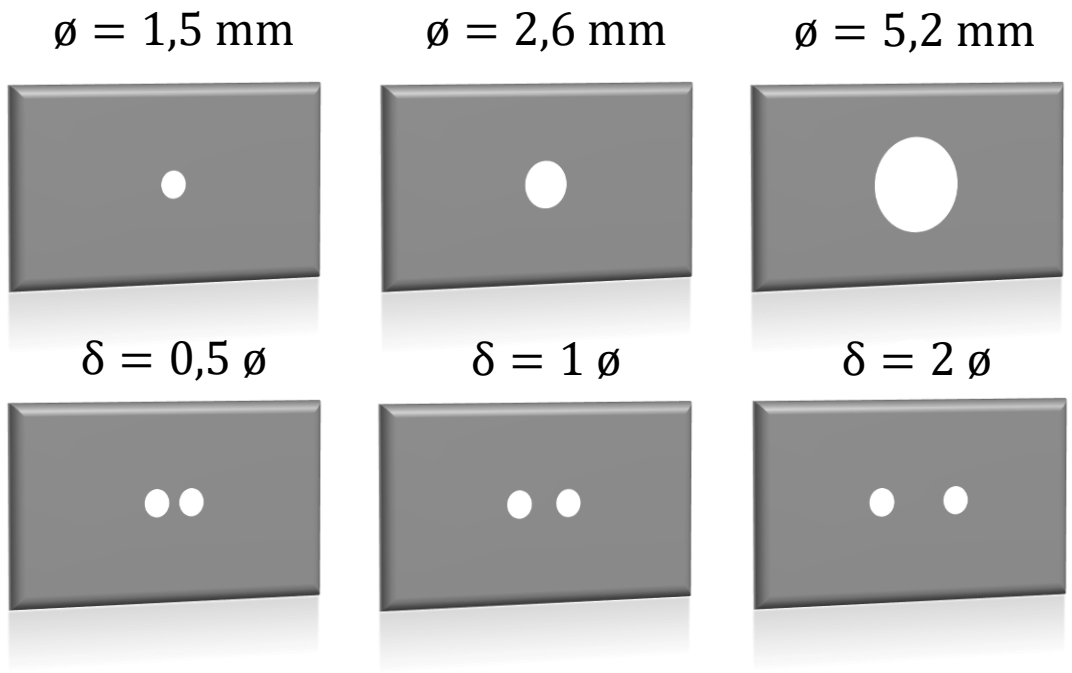


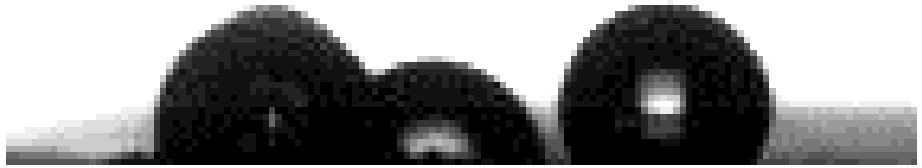


Main Objectives

- Vary the geometric parameters of the biphilic patterns

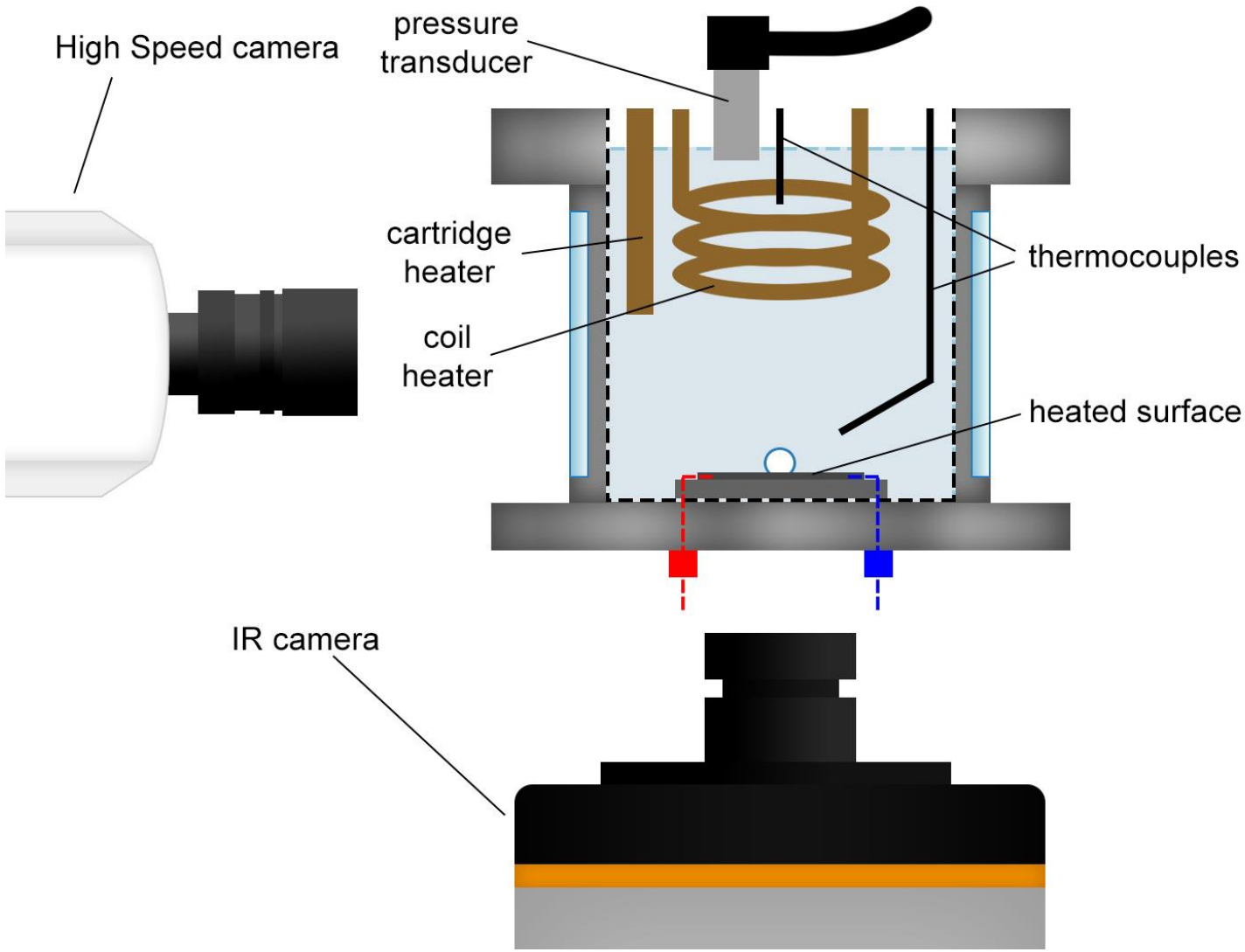
- Accomplish an ideal biphilic configuration





Experimental setup

- High Speed Imaging
- Thermography



Main conclusions

- Smaller superhidrophobic regions promote larger evaporated mass flux ratio in terms of total area i.e. larger latent heat removal

- Optimum distance between superhydrophobic regions is approximately the size of one diameter of a superhydrophobic region

Thank you for your attention!