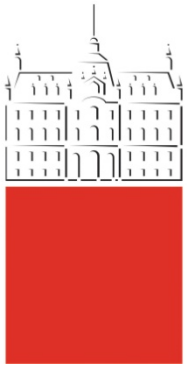
University of Ljubljana
Faculty of Mechanical Engineering



Research Team name:	Laboratory for Thermal Technology
Presenter name:	Prof. Dr. Iztok Golobic
	Anze Sitar
Country:	Slovenia

Team Presentation – Annual Workshop, COST Action MP1106
Dublin, September, 2012

Team's general info

Research Team Name: Laboratory for Thermal Technology

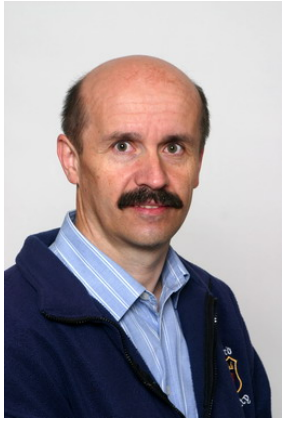
Number of team members: 17

Team leader:

Iztok Golobic

iztok.golobic@fs.uni-lj.si

(Mechanical Engineer)



Assistant:

Anze Sitar

anze.sitar@fs.uni-lj.si

(Mechanical Engineer)

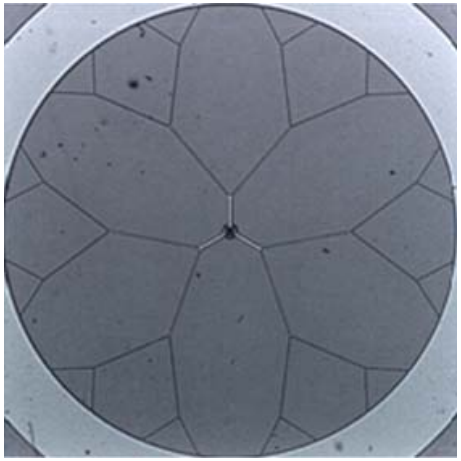
- 6 Ph.D. students
- 10 undergraduate students

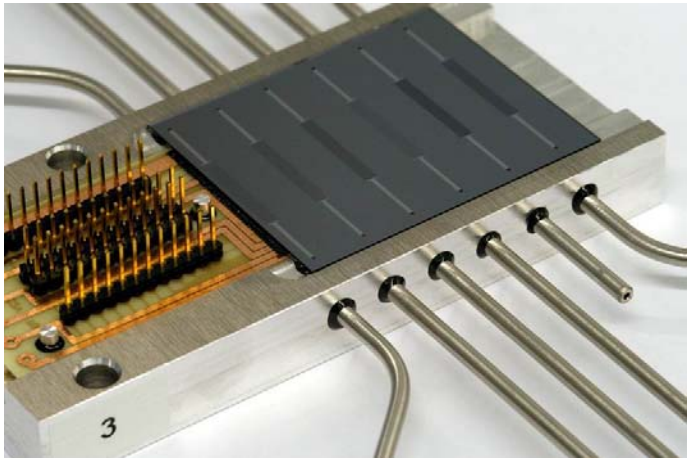
Relevance to MP1106

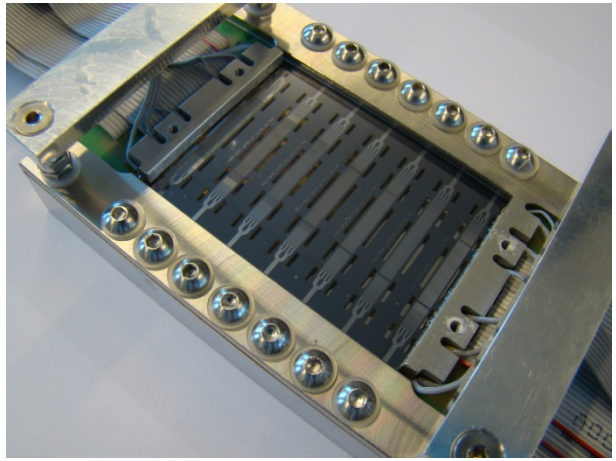
Research interests related to MP1106:

- Pool boiling phenomena on thin foils – local transient temperature field

- Boiling in microchannels – enhanced heat transfer







- Nanocoatings – boiling heat transfer enhancement

Lab description

Basic facilities, equipment, devices:

- IR camera
- IR high speed camera
- High speed and high definition video camera
- High speed data aquisition and control systems
- Bomb calorimeter
- Vacuum chamber and vacuum pump
- Various flow meters pressure and temperature sensors
- Microscope with a high power light source
- Thermal conductivity meter
- pH and conductivity meter
- other equipment

Projects

#1 project : P2-0223 Heat and Mass Transfer

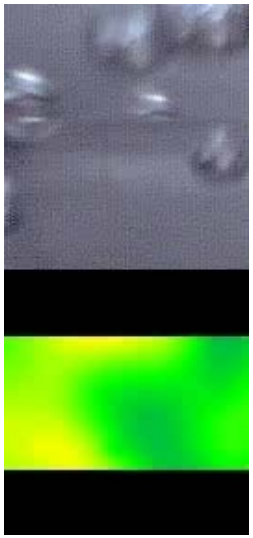
Title: Pool Boiling on thin foils

Duration: 2009 - 2014
Funding organization: Ministry of Higher Education, Science and Technology of the Republic of Slovenia
People involved and their function: 3 PhD students

Reference: I. Golobic, J. Petkovsek, D.B.R. Kenning, Bubble growth and horizontal coalescence in saturated pool boiling on a titanium foil, investigated by hihg-speed IR thermography, Int. J. Heat Mass Transfer 55 (2012) 1385-1402.

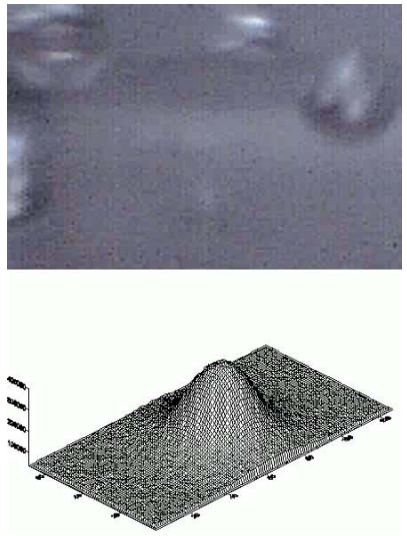
Temperature distribution

1000 fps



Heat flux distribution

1000 fps



Projects

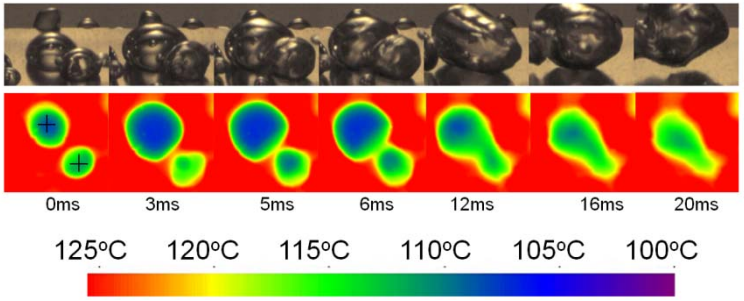
#2 project : P2-0223 Heat and Mass Transfer

Title: High heat flux pool boiling

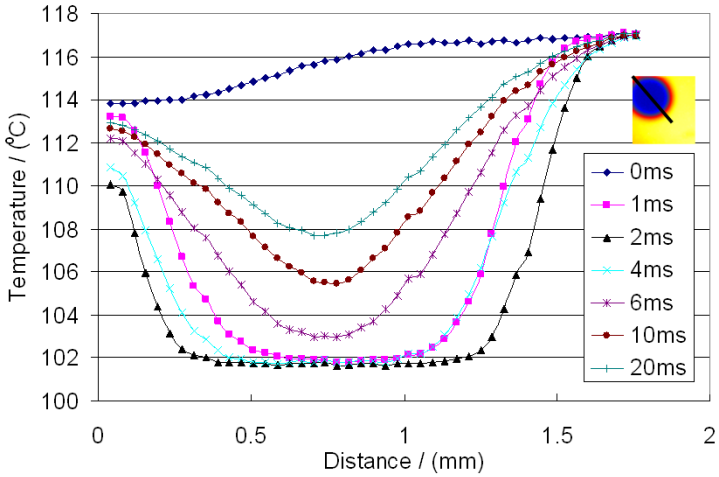
Duration: 2009 - 2014
Funding organization: Ministry of Higher Education, Science and Technology of the Republic of Slovenia
People involved and their function: 2 PhD students
Facilities/equipment: High speed IR and HSV camera

Reference: I. Golobic, J. Petkovsek, H. Gjerkes, B.D.R. Kenning, Horizontal chain coalescence of bubbles in saturated pool boiling on a thin foil, Int. J. Heat Mass Transfer 54 (2011) 5517-5526.

Bubble coalescence

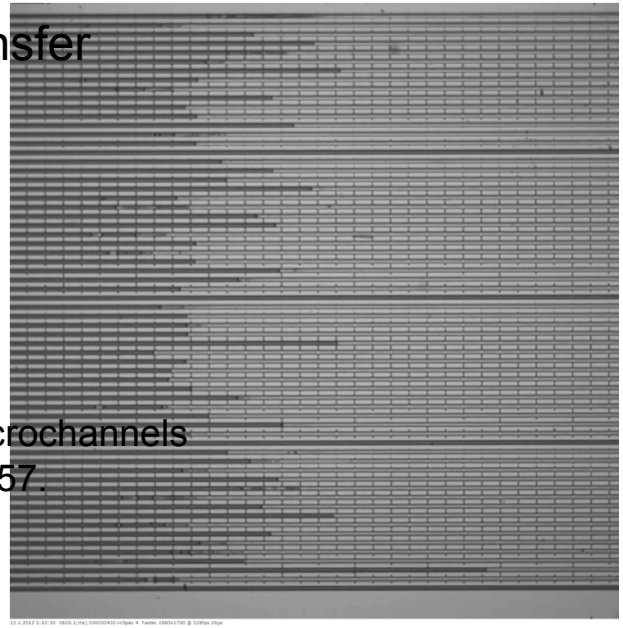


Transient temperature field under a growing bubble



Projects

#3 project : P2-0223 Heat and Mass Transfer

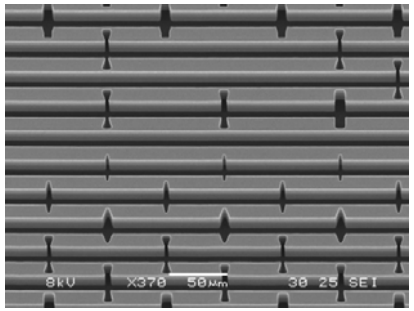


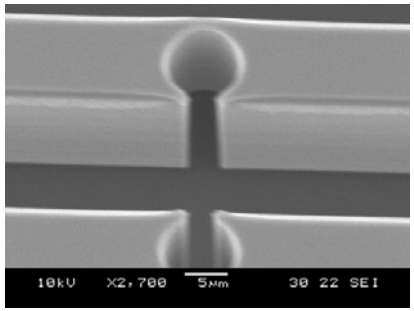
Title: Boiling in microchannels

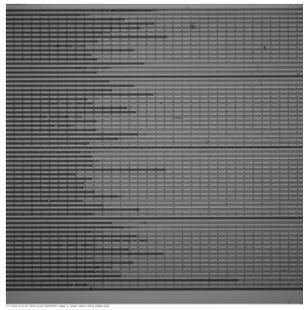
Duration: 2009 - 2014
Funding organization: Ministry of Higher Education, Science and Technology of the Republic of Slovenia
People involved and their function: 2 PhD students

Reference: A. Sitar, I. Sedmak, I. Golobič, Boiling of water and FC-72 in microchannels enhanced with novel features, Int. J. Heat Mass Transfer 55 (2012) 6446-6457.

Boiling of water in 25 25 μm microchannels at 528 fps)







Bubble growth at the onset of boiling (water in 50 50 μm, 87667 fps)

Projects

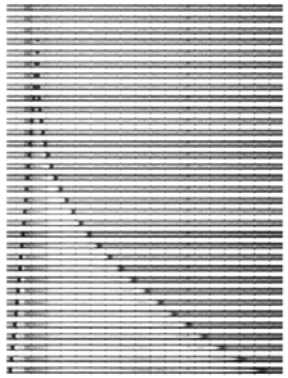
#4 project : P2-0223 Heat and Mass Transfer

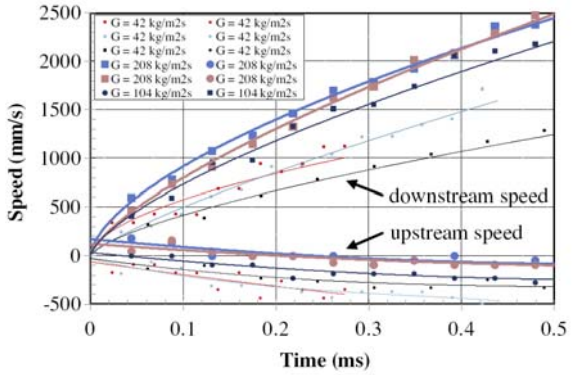
Title: Bubble growth in microchannels

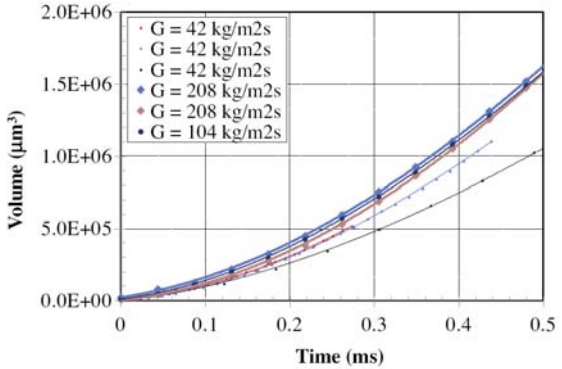
Duration: 2009 - 2014
Funding organization: Ministry of Higher Education, Science and Technology of the Republic of Slovenia
People involved and their function: : 2 PhD students

Reference: A. Sitar, I. Sedmak, I. Golobič, Boiling of water and FC-72 in microchannels enhanced with novel features, Int. J. Heat Mass Transfer 55 (2012) 6446-6457.

Bubble elongation at the onset of boiling (water in 50 × 50 μm, 22956 fps)







Topics for Research Proposal

#1 Topic

Title: **Enhancement of boiling in microchannels with porous nanocoatings**

Promotion images & text:	separation of vapor and liquid at boiling enhanced heat transfer with h > 10 MW/m^{2}K
Duration:	2013 - ?
Expertise required:	experience in MEMS and micro sensors
Facilities/equipment required:	High speed imaging, AFM and data aquisition systems