

Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Experiments of Flow Boiling of R245fa in a Horizontal Pipe Using Particle Image Velocimetry¹ HANNAH MORAN, VICTOR VOULGAROPOULOS, DIMITRI ZOGG, OMAR MATAR, CHRISTOS MARKIDES, Imperial College London — A bespoke facility is used to measure flow boiling of the refrigerant R245fa in a 12.7-mm diameter stainless steel pipe, to which uniform heating of up to 135 kW/m² may be applied. A range of measurement techniques are utilised in the facility to obtain results over a range of flow rates and heat fluxes. Differential pressure measurements are taken, whilst thermocouples at the tube walls allow the calculation of the heat transfer coefficient, and flow visualisation is accomplished using high-speed imaging. The results are then compared to other experimental work and to correlations in the literature. In addition, laser-based measurements, such as particle image velocimetry (PIV), are performed, providing detailed spatially- and temporally-resolved information on the velocity and turbulence characteristics in the liquid phase. The measurements provide new insight into the hydrodynamic and thermal interactions in these flows and help to build a comprehensive picture of the phenomena involved in the boiling process.

¹Imperial College London Marit Mohn Scholarship for HM, UK EPSRC [EP/P004709/1], Royal Society-DFID Africa Capacity Building Initiative, RAEng/PETRONAS Research Chair for OKM

Omar Matar
Imperial College London

Date submitted: 29 Jul 2019

Electronic form version 1.4