

Abstract Submitted
for the DFD10 Meeting of
The American Physical Society

Measures of Thermal Transpiration Flow¹ MARCOS ROJAS, IRINA GRAUR, PIERRE PERRIER, I.U.S.T.I. UMR 6595, Ecole Polytechnique Universitaire de Marseille — Thermal transpiration is the macroscopic movement of gas-particles induced by a temperature gradient. The gas-particles move from the lower to the higher temperature zone. The main aim of the present work is to measure experimentally the flow created by thermal transpiration in a tube heated at its outlet. The experimental system is composed by a circular cross section micro-tube and two reservoirs settled respectively at the inlet and outlet of the capillary. The reservoirs are coupled to two high-speed response time capacitance diaphragm gauges which monitor the pressure variation in time. By monitoring the pressure variation in time is possible to measure the macroscopic movement of gas-particles along the tube: by thermal transpiration gas-particles move from the cold to the hot region of the tube increasing the hot-side reservoir absolute pressure; while a drop of pressure is registered in the cold-side reservoir. The experiments are conducted for three different gases, Argon, Helium and Nitrogen, in a pressure range from 0.1 to 10 *torr* and for three different temperature differences: $\Delta T = 30, 40, 50$ degrees. The gas rarefaction conditions go from transitional to slip regime.

¹This research is funded by the [European Community's] Seventh Framework Programme ([FP7/2007-2013] under grant agreement n-215504

Marcos Rojas
I.U.S.T.I. UMR 6595, Ecole Polytechnique Universitaire de Marseille

Date submitted: 10 Aug 2010

Electronic form version 1.4