

Abstract Submitted
for the DFD16 Meeting of
The American Physical Society

DSMC Simulation of Radiometric Flow in a Ratchet-Channel Nano-Pump EHSAN ROOHI, VAHID SHAHBI, Ferdowsi University of Mashhad, TOBIAS BAIER, STEFFEN HARDT, Technical University Darmstadt — The current paper presents a description of the fluid and pumping characteristics of a ratchet-type nano-scale pump suggested by Donkov et al. [1] and presents the optimum geometry and working conditions of the pump. The pump consists of a ratchet channel with the temperature gradient applied between the opposing walls. Here, we report the physical mechanism of flow induction within the pump and show that the combination of configuration and boundary temperature of this pump induces a radiometric-type flow. Benefiting from the DSMC simulations, we suggest the optimum working condition/geometrical size of the pump. Comparison of DSMC simulation with analytical relations is reported.

Ehsan Roohi
Ferdowsi University of Mashhad

Date submitted: 01 Aug 2016

Electronic form version 1.4