
VA 2: Transient rarefied Gas Flow through short Channels

Time: Monday 14:00–14:40

Location: H6

Invited Talk

VA 2.1 Mon 14:00 H6

Transient rarefied gas flow through short channels at arbitrary pressure ratios — ●STYLIANOS VAROUTIS and CHRISTIAN DAY
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Steady state flows of rarefied gases through orifices, slits, short tubes, and channels are well studied. In spite of the high practical interests to the transient flows of rarefied gases, the problem of short channel (i.e. parallel plates) flow has not been studied from this point of view. The aim of the present work is to study transient rarefied gas flow through

a short channel based on the direct simulation Monte Carlo method. The mass flow rate and corresponding macroscopic parameters in the inlet and outlet of the channel, are calculated as a function of the time and the gas rarefaction. Two values of the pressure ratio, i.e., 0 and 0.5, and two values of the length-to-height aspect ratio, i.e. 1 and 5, are considered. A characteristic time equal to the one a particle needs to cross the channel height with the most probable molecular speed is introduced. The typical time to establish the stationary flow is presented as well.