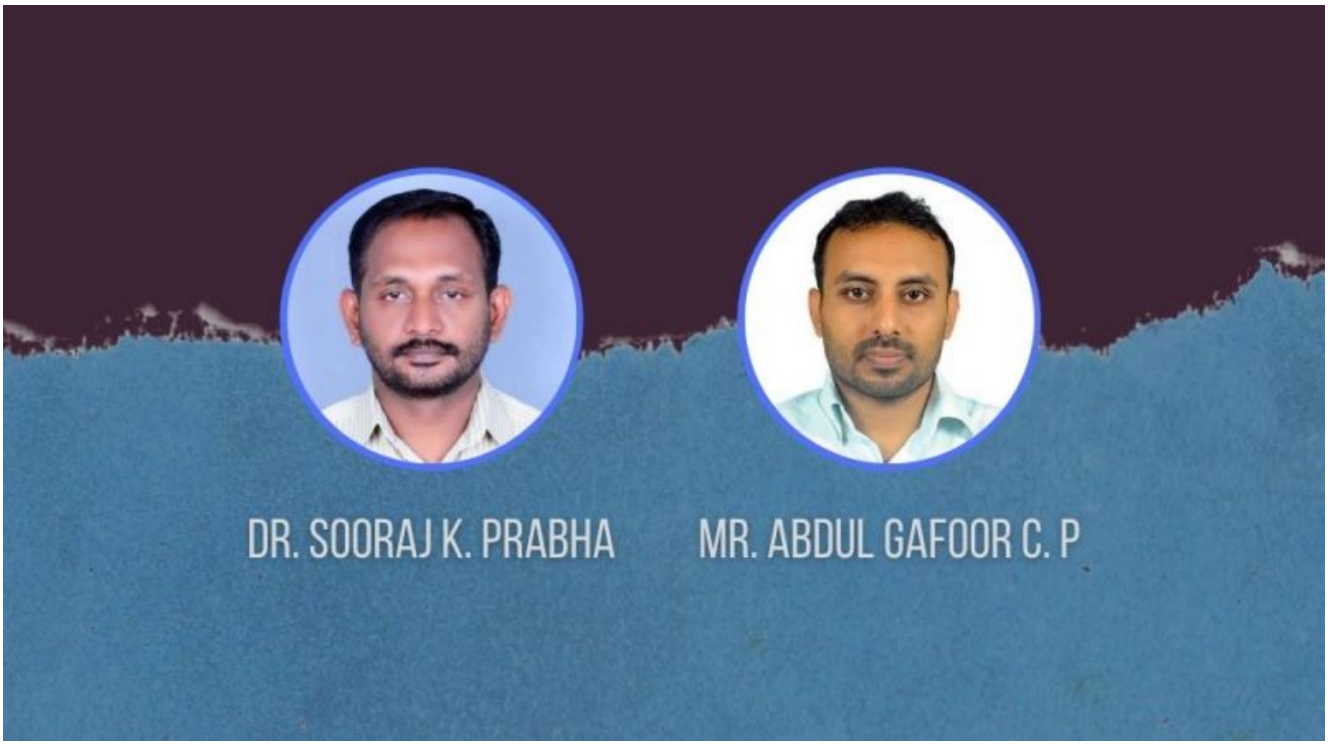
ME Dept faculty members publish research paper in American Physical Society's Physical Review E journal



The prestigious international journal Physical Reviews E published by the American Physical Society has recently published a research paper authored by a team of researchers in the ME Dept of Vidya. That is indeed a shining testimony to the vibrancy of Vidya in the research front.

The paper titled “Variation of momentum accommodation coefficients with pressure drop in a nanochannel” was authored by Dr Sooraj K Prabha (Associate Professor, ME Dept), Mr Abdul Gafoor C P (Junior Research Fellow, ME Dept) and Dr Sarith P Sathian (Associate Professor, Department of Applied Mechanics, IIT Madras) has been published online in the journal Physical Review E (American Physical Society) 102, 023303 on 10 August 2020. The research leading to the publication of the paper was carried out as part of a project funded by the Science and Engineering Research Board, Dept of science and Technology, Govt of India.

The Editorial Team of *News & Events* congratulates Dr Sooraj Prabha and team for brining such great glory to Vidya.

Abstract of the paper

Accommodation coefficients (ACs) are the phenomenological parameters used to evaluate gas-wall interactions. The gas transport through a finite length nanochannel will confront the variation of properties along the length of the channel. A three-dimensional molecular dynamics simulation has been carried out to examine this streamwise inhomogeneity of flow characteristics in a nanochannel. The rarefaction of the flow to the downstream direction is a crucial behavior in a pressure-driven nanochannel flow. This is manifested as the variation in velocity and temperature along the length of the channel. Subsequently, the interactions between the gas and wall particles will get reduced considerably. Moreover, the characteristics near the wall are examined in detail. A nonhomogeneous behavior in density and velocity profile near the wall is reported. Further, the momentum accommodation coefficient (MAC) in both the tangential and normal directions is examined along the lengthwise sections of the channel. The results show a significant variation of tangential and normal MACs along the length. Further, three channels with different length-to-characteristic dimension (L/H) ratios are considered to investigate the effect of L/H ratio. All three channels are subjected to the same pressure drop along the length. It is observed that the MACs and slip length show distinct behavior for different (L/H) ratios. The work establishes that the variation of MAC along the length of the channel has to be considered in modeling the nano- and microtransport systems.

More info on the paper

More information on the paper can be accessed HERE.
