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## Numerical Study of Microfluidic Transitional Flow Regime Curvature Effects for Compressible Isothermal Gases using Generalized Slip Boundary Conditions

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## Abstract content <br> &nbsp; (Max 300 words)<br><a href="http://events.saip.org.za/getFile.py/a target="\_blank">Formatting &<br>Special chars</a>

In this paper we develop a numerical implementation of a generalized second order boundary condition reported by Guo et al [Physical Review E Vol. 89, 013021 (2014), DOI: 10.1103/PhysRevE.89.013021] for nonequilibrium gas flows and utilize the implementation to investigate microfluidic transitional flow regime curvature effects. The generalized boundary conditions expressed in terms of a nonlinear velocity slip with a wall function are incorporated into a modified nonlinear finite volume discretization incorporating generalized finite differences for the boundary conditions which we develop for an extended Navier-Stokes system of equations. Utilizing the developed computational scheme we then study the influence of transitional flow regime curvature effects in a gas piston-cylinder pressure balance interface gap and report on the observed microfluidic characteristics and behaviour.

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