**Monte Carlo Simulations of Rarefied Atmospheres**

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**Abstract:**

Our group at The University of Texas at Austin has developed the PLANET code based on the Direct Simulation Monte Carlo (DSMC) method to model rarefied atmospheres. Solution of the Boltzmann equation via statistical simulation is a powerful technique to compute gas flows at low densities when the Navier-Stokes equations fail. This will be illustrated with a number of examples including 3-D simulations of the volcanic atmosphere of Jupiter’s moon Io, and the Pluto-Charon system.

**Bio-sketch:**

Prof. Varghese holds the Ernest H. Cockrell Centennial Chair in Engineering and is the Director of the Center for Aeromechanics Research at UT Austin. His research focuses on understanding the basic molecular processes occurring in high speed and high temperature, and non-equilibrium flows. This is an inter-disciplinary field, requiring a synthesis of physics and chemistry with the more traditional engineering disciplines of fluid mechanics, heat transfer, and thermodynamics. He applies his work to the study of hypersonic and rarefied flows, plasmas, and combustion.

He was a Fulbright Senior Scholar in France in 1993. He received the Lockheed Martin Aeronautics Company Award for Excellence in Engineering Teaching in Spring 2003 and was elected to the Academy of Distinguished Teachers at the University of Texas in 2005. In February 2012 he was selected Professor of the Year by the UT Senate of College Councils and was awarded The University of Texas System Regents’ Outstanding Teaching Award in August 2016.

