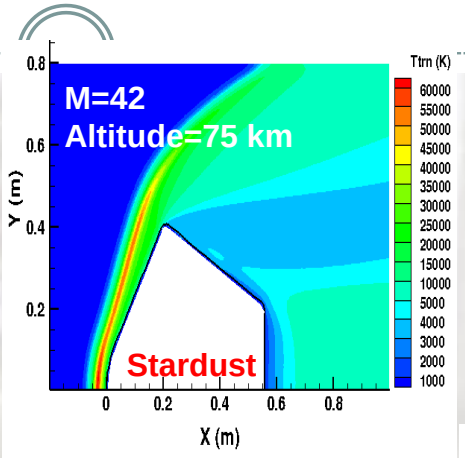
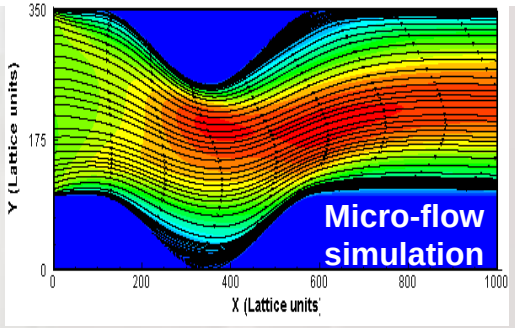
DEPARTMENT OF AEROSPACE ENGINEERING

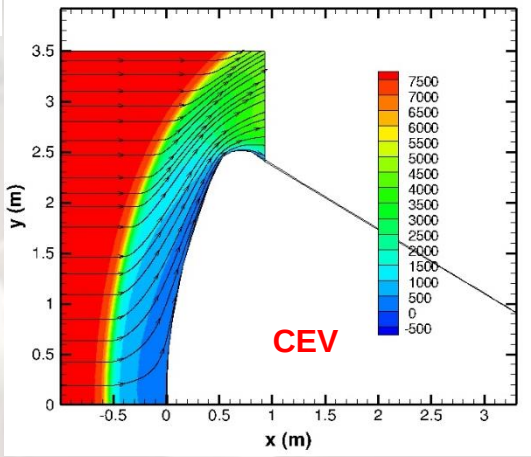
NON-EQUILIBRIUM FLOW SIMULATION LABORATORY (NFSL) – 1/3

Research Domain:

- **Hypersonic/Rarefied Gas Flows:** Kinetic flow solver development and analysis.
- **Micro/Nanofluidics:** Molecular dynamics analysis.
- **Dusty Gas Flows:** Gas-granular computational model development and analysis, e.g., planetary landing.
- **Thermal Design and Heat Transfer:** Reentry ablative thermal response.







Support:

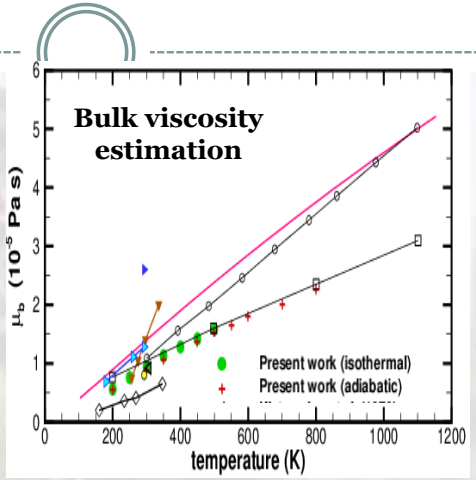
- Sponsored project funding (DST, ISRO, ARDB).

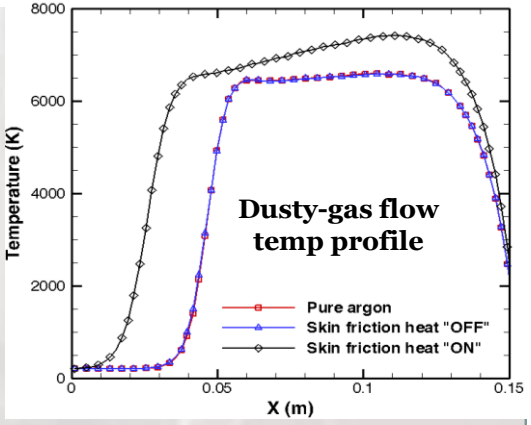
DEPARTMENT OF AEROSPACE ENGINEERING

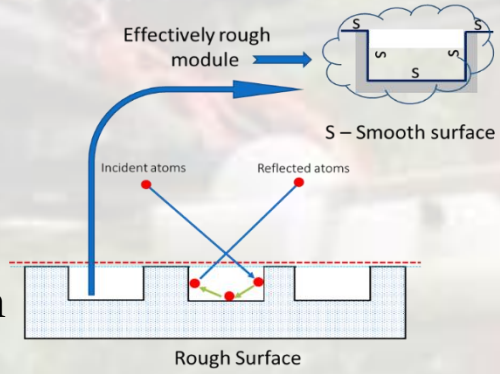
NON-EQUILIBRIUM FLOW SIMULATION LABORATORY (NFSL) – 2/3

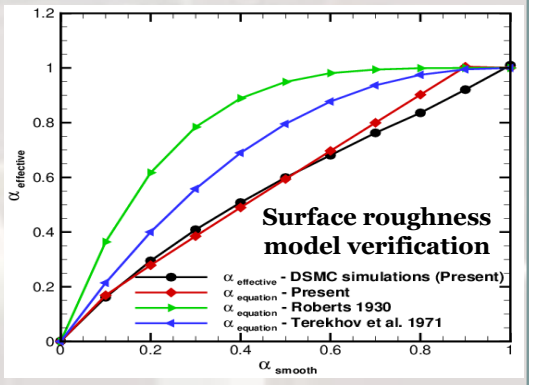
Fundamental Research:

- **Estimation of Bulk Viscosity:** Novel non-equilibrium thermodynamics based approach.
- **Shock/flow Structures in Dusty Gas Flows:** Particle based approach and solver development.
- **Surface Roughness Modeling:** Novel particle based approach to model surface roughness and its effect.
- **Catalytic Surface Modeling:** Modeling of adsorption/absorption and surface recombination.









DEPARTMENT OF AEROSPACE ENGINEERING

NON-EQUILIBRIUM FLOW SIMULATION LABORATORY (NFSL) – 3/3

Applied Research:

- **Modeling of Planetary Landing:** Development of in-house dusty gas flow solver for lunar landing.
- **Ablative Thermal Response and Conjugate Thermal Analysis:** Coupling of in-house solvers for coupled flow-thermal analysis.
- **Space Debris Trajectory Analysis:** In-house DSMC solver used for space debris trajectory analysis.
- **Plug Nozzle Flow Modeling:** Experiments and simulation for plug nozzle flow modeling.