PEGASUS Software

3-D Rarefied gas dynamics simulation software

RGS3D

Outline

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- **Under rarefied gas condition,**

  Simulation software to solve a governing equation of molecular gas dynamics theory by probabilistic simulation method, DSMC(Direct Simulation Monte Carlo)method.

  (Simulation method is same as DSMCM except mesh system)

- **Application**
  - **Flow analysis for various vacuum chamber**
  - **Flow analysis for vacuum pump**
  - **Simulation of vacuum deposition**
- **Feature**
  - **Interface with NASTRAN format for mesh data**
  - **Many kinds of species with large difference in density can be simulated by Weight Algorithm**
  - **Fast Monte Carlo method under free molecule flow**
  - **Large mesh width can be taken by new collision method**

Vacuum evaporation

Simulation of distribution of film thickness

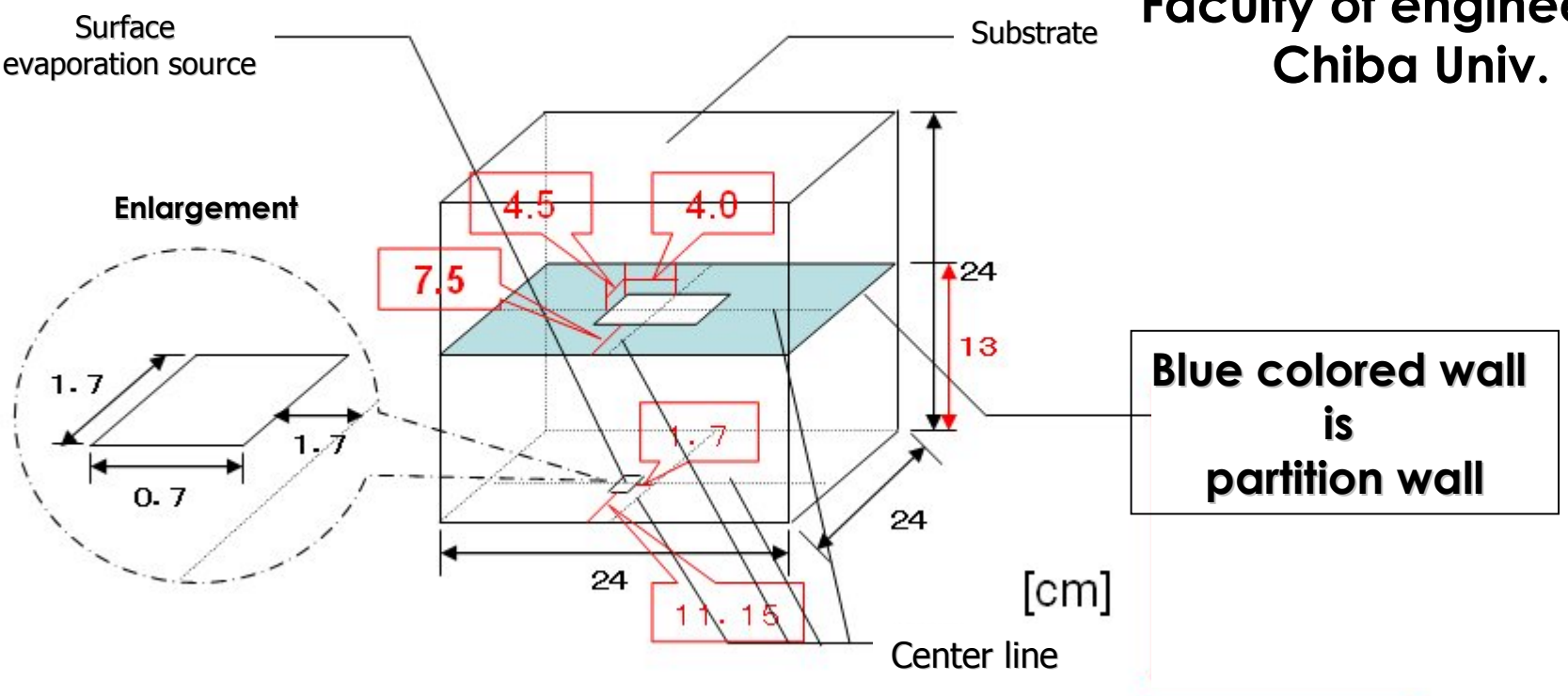
Comparison with experiments regarding dependency of Argon gas pressure

Equipment and the other parameters

Mass : 197amu
Diameter : 174pm (1.74Å)
Temperature : 1400℃ (1673 [K])
Flux : 0.874mg/sec (2.6565 X10^{18} [#/sec])

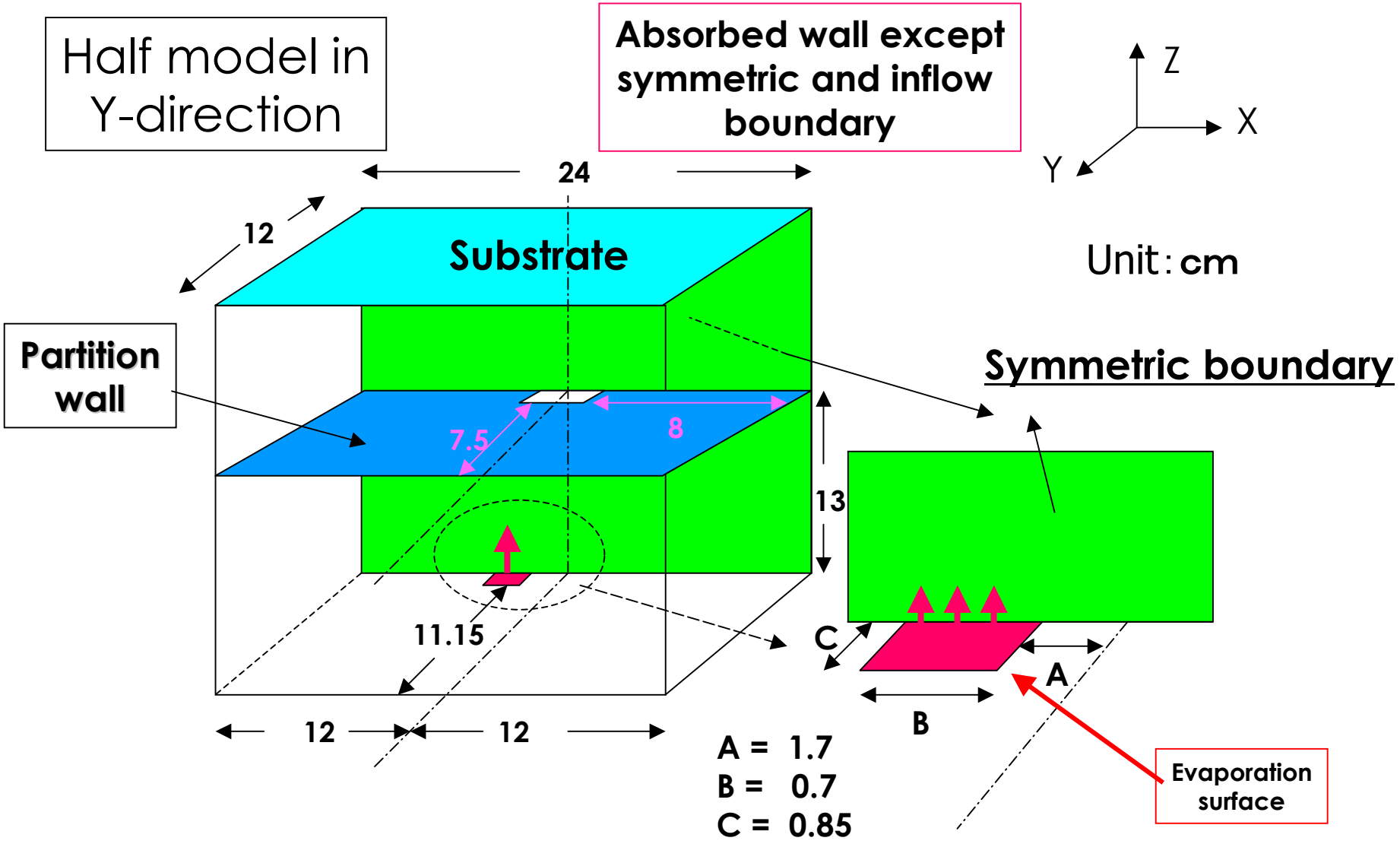
Experiment by
Associate Prof.
M. Nakamura

Faculty of engineering
Chiba Univ.

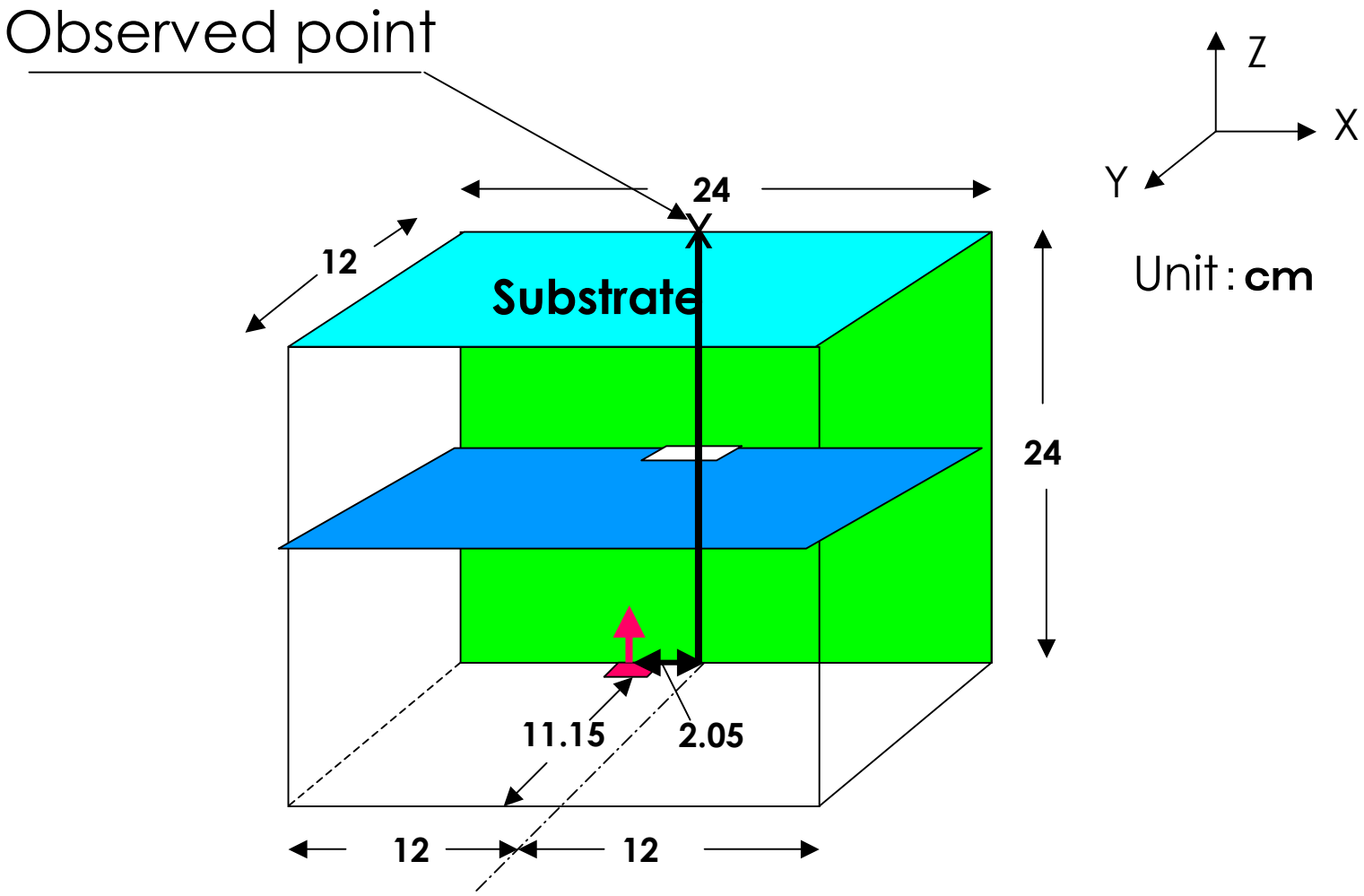


Blue colored wall is partition wall

Computational model



Observed point of film thickness



Comparison with simulation and experiment of film thickness

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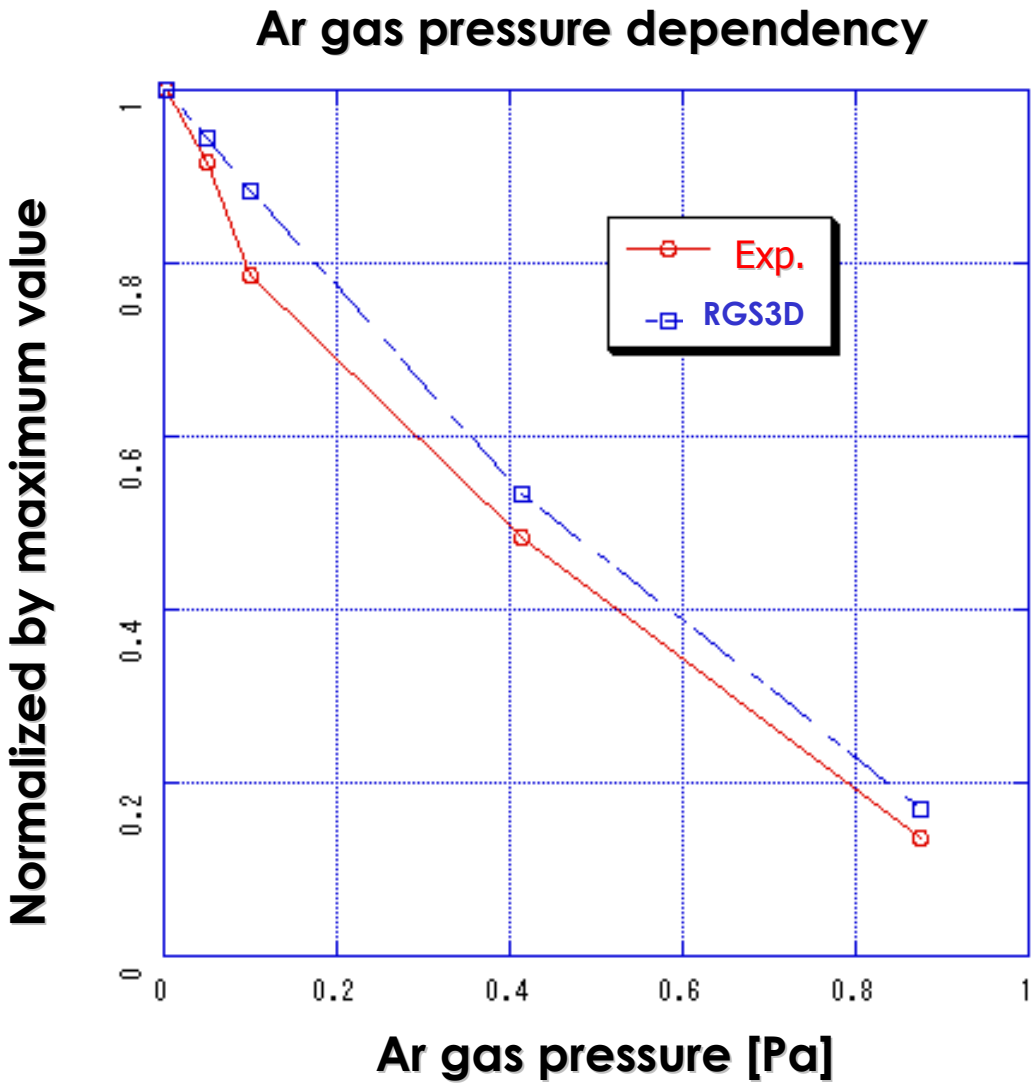

In this simulation,
gas flow of Ar is neglected.
So there are slightly differences.

Distribution of speed of incident particles to substrate

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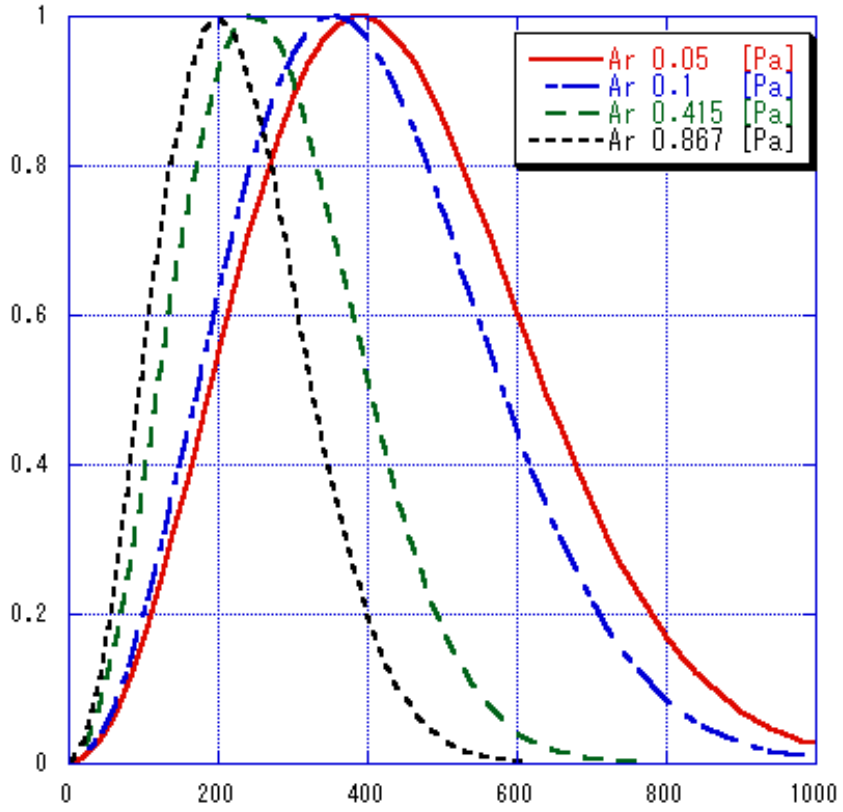
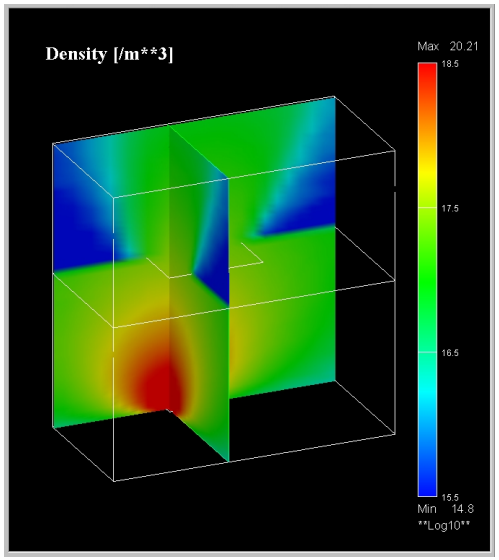
Frequency distribution of speed

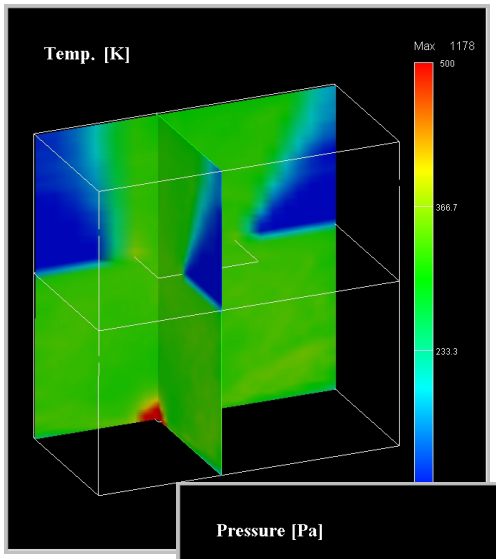


Speed of incident particles [m/s]

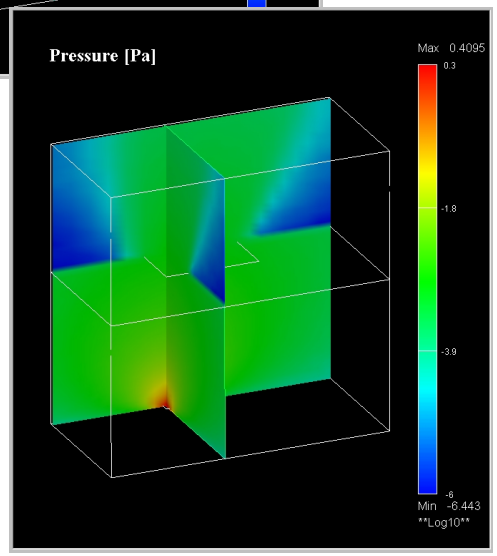
Spatial distribution of density,pressure, etc.



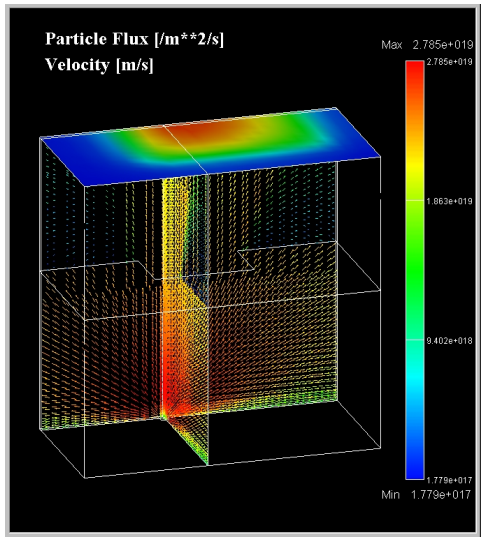
Density



Temperature



Pressure



Particle flux and Velocity