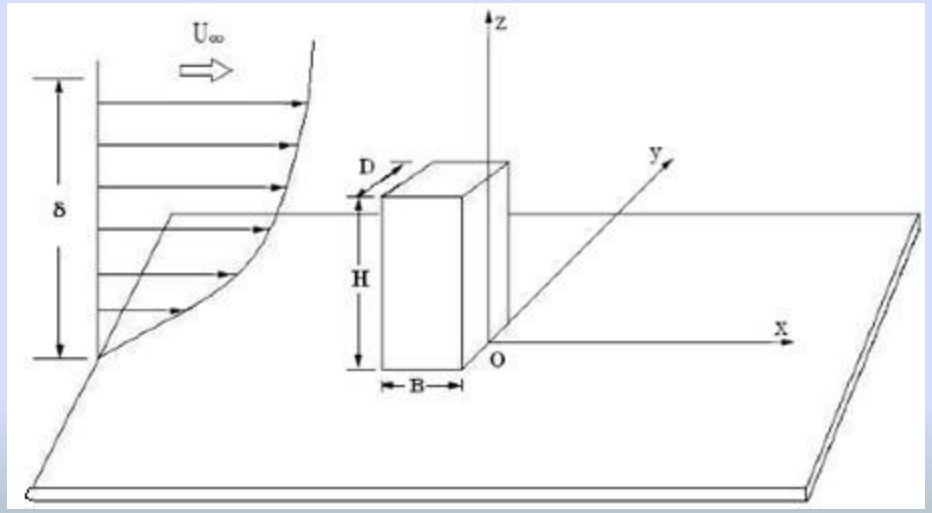
DIRECT NUMERICAL SIMULATION (DNS) OF FLOW PAST A SURFACE-MOUNTED SQUARE PRISM

Background

Surface-mounted prisms are very common in modern cityscapes. The unsteady wind flow around them is important from structural and aerodynamic perspectives, as well as urban pollutant transport.



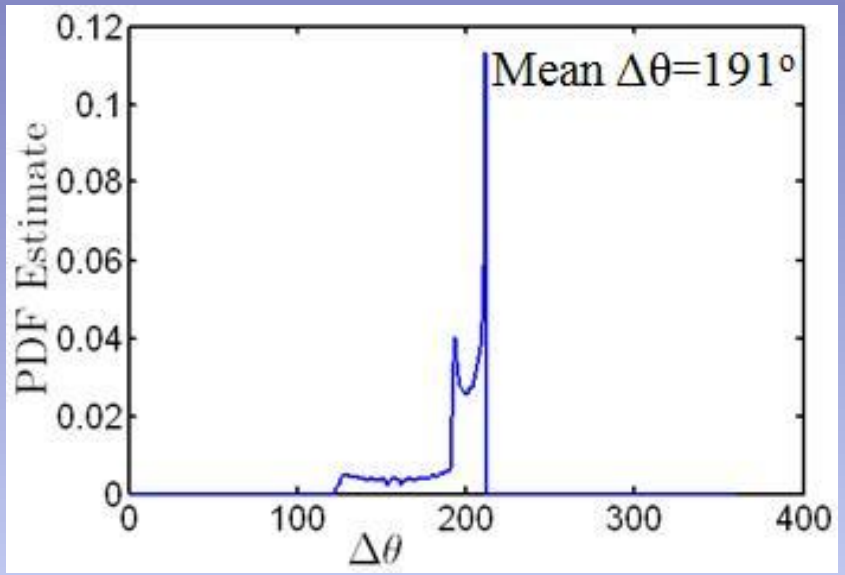
Flow and geometrical parameters for a surface-mounted square prism

Objectives

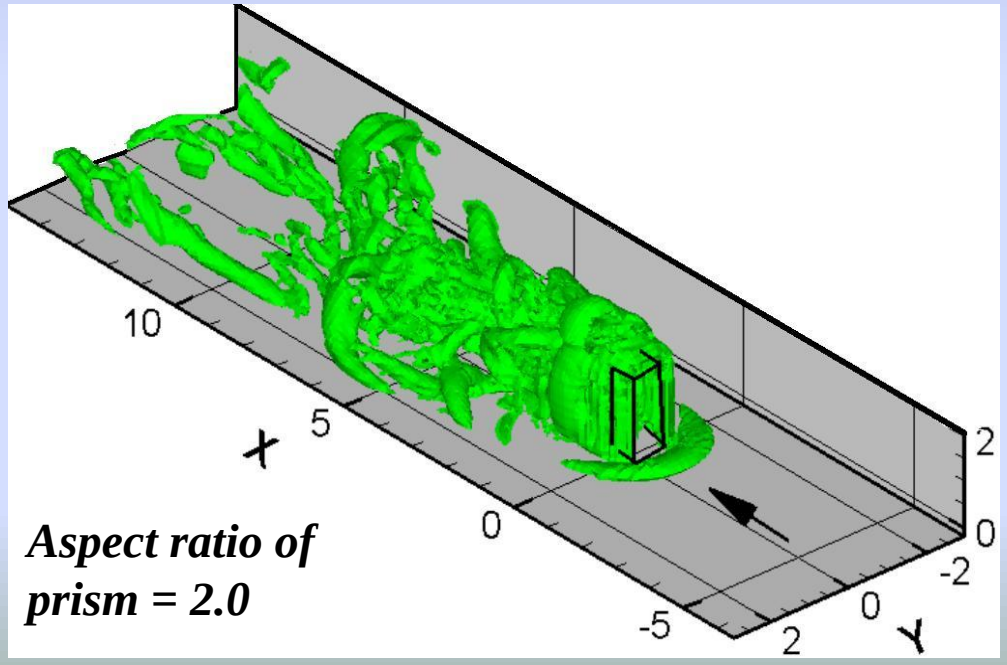
To simulate the flow over a finite-height square prism located on the ground and analyze the resulting flow structures.

Research Carried Out

- DNS of flow past 2-D and 3-D square cylinders has been carried out using an in-house code written for parallel computation.
- Velocity data have been analyzed for a 3-D prism.



Phase difference between spectral peaks at symmetrically located points about a prism



Coherent flow structures over a square prism

Findings and Future Work

- Span-wise vortices are more likely to be shed anti-symmetrically than otherwise.
- Experiments are being planned to validate the numerical observations.