



Lecture No. 59

**Czech Society for Mechanics
and Institute of Thermomechanics, CAS**

invite you to a lecture and discussion within
the lecture series **Institute of Thermomechanics Seminar**

Active grids as a tool for turbulence and wind energy studies

given by

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Abstract: Traditional wind tunnel testing has been limited by our ability to accurately control the incoming flow conditions. While a wind tunnel offers simple control of the Reynolds number (velocity), conducting measurements in different turbulent flows is significantly more challenging due to severe limitations on our ability to produce bespoke turbulent shear flows in a wind tunnel. Over the last quarter-century, active grids have become popular tools to overcome this limitation. An active grid is a motorized device placed at the inlet of a wind tunnel that produces a transient blockage. By controlling the time variation of this blockage, a user can exert some degree of control authority over the incoming turbulence conditions. It will be demonstrated that using this methodology, the turbulence intensity and the mean shear can be adjusted independently, offering unprecedented control authority over the experimental turbulence conditions. The application of this approach to wind energy will then be illustrated via particle image velocimetry measurements of the near-field of a model horizontal axis wind turbine. This will be compared to simpler measurements of a vertical axis wind turbine in more basic turbulent flows produced by conventional meshes. Ultimately, increasing turbulence intensity is shown to mitigate Reynolds number effects, and impact wake recovery.

The lecture will be held on Tuesday, December 18, 2018 at 11:00 in the building of the Institute of Thermomechanics (lecture room B), Dolejškova 5, 182 00 Prague 8

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