INSTITUT FÜR STRÖMUNGSMECHANIK UND WÄRMEÜBERTRAGUNG

Technische Universität Wien

EINLADUNG

zum Vortrag von Herrn

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über

"Flow Visualization of Turbulent Large-Scale Structures and Flow Control at the Vortex Fluid Dynamics Lab"

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“Flow Visualization of Turbulent Large-Scale Structures and Flow Control at the Vortex Fluid Dynamics Lab”

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Abstract
It is now generally accepted that most turbulent shear flows have a characteristic large-scale structure (LSS). The task now is to determine what the LSS is for any particular flow that one is interested in modeling or controlling/influencing. If it is not a well studied flow where the LSS is already known, careful use of experimental flow visualization allows discovery of the qualitative nature of the flow LSS. To influence the flow effectively we must have an idea what levers are at our disposal before we can devise practical control actuators. We need to know the geometric nature of the LSS that is expected to occur, and in what frequency ranges. Then forcing perturbations can be designed that will be amplified by or negate the naturally occurring LSS, depending on the desired outcome. We will discuss some of the LSS studied at the Vortex Fluid Dynamics Lab (VfDL) and the effect that simple open loop control methods have been shown to have. Among the flows discussed are: vortex ring 3-D structure and computation, separation control over a forward facing blunt cylinder and backward-facing step, synthetic jet control of a jet in cross-flow, pulsation influence on orifice plate flow meters, and another type of synthetic jet we call the “synthetic fence jet”.