

KOLLOQUIUM ÜBER NEUERE ARBEITEN AUF DEM GEBIETE  
DER MECHANIK UND STRÖMUNGSLEHRE  
an der Technischen Universität Wien

## EINLADUNG

zum Vortrag von Herrn

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über

## “Instability Wave Models of Turbulent Jets from Round and Serrated Nozzles”

**Zeit:** Donnerstag, 6. Mai 2010, 16 Uhr c.t.

**Ort:** SEM 322

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# **“Instability Wave Models of Turbulent Jets from Round and Serrated Nozzles”**

*Dr. Kristjan GUDMUNDSSON*

We study pressure fluctuations associated with large-scale coherent structures in turbulent round and serrated jets. Linear disturbances to the turbulent mean flow of the round jet are modeled via linear stability analysis and the Parabolized Stability Equations (PSE). We show that PSE provides better agreement with near-field microphone-array data at low frequencies than previous models based on linear stability theory. We examine the extent to which microphone data is contaminated by fluctuations uncorrelated with large-scale structures. By filtering out the uncorrelated fluctuations, via the proper orthogonal decomposition (POD), better agreement between data and theory is obtained. We next extend the linear stability analysis of round jets to include the effects of azimuthal inhomogeneities of serrated jets. We solve the resulting system of equations and find new modes, associated with the streamwise vorticity of the serrated-jet mean flow. All unstable modes of the serrated jet are stabilized, potentially explaining the noise reduction achieved by such jets. We also compare these predictions to POD-filtered microphone measurements, generally finding good agreement.