



# COLLOQUIUM

Group: Engineering Fluid Dynamics

As part of his MSc thesis assignment

**Ronald Meijers**

will give a presentation, entitled:

## **A Physical Model for Sound Absorption by Micro Perforated Plates**

**Date:** Friday January 27, 2012

**Time:** 14:00

**Room:** ZH 286

### **Summary:**

In room acoustics, a serious drawback of sound absorbing materials is that they are inflammable or produce dust. Two decades ago, Maa proposed to use a plate with so-called micro perforations backed by an air cavity. An optimized geometry, size and perforation ratio of the perforated plate in combination with a specific cavity depth can provide strong absorption with improved fire safety and reduced dust production. In order to optimize these parameters, a physical model is needed.

Such a model is proposed. This model is validated using results of experiments in which the reflection of acoustic waves at normal incidence is considered. This is done in a so-called impedance tube. In addition to the influence of parameters like perforation geometry, perforation ratio, frequency and cavity depth, we also discuss the effect of the amplitude of sound waves. For large sound amplitudes, the nonlinear behaviour of the flow in the cavity is important.

### **Assessment committee:**

Prof.dr.ir. H.W.M. Hoeijmakers (chairman)  
Prof.dr.ir. A. Hirschberg (mentor)  
Ir. C.C.J.M. Hak (TU/e) (mentor)  
Dr.ir. C.H. Venner  
Dr.ir. Y.H. Wijnant

### **Chairman:**

d.d.