Universität Bremen

CENTER OF APPLIED SPACE TECHNOLOGY AND MICROGRAVITY

ZARM

Fluid Dynamics Seminar

Date: Wednesday, November 2nd 2016 at 13:00

Location: ZARM, Room 1730

Mathematical modeling of acoustic damping in porous ceramic structures

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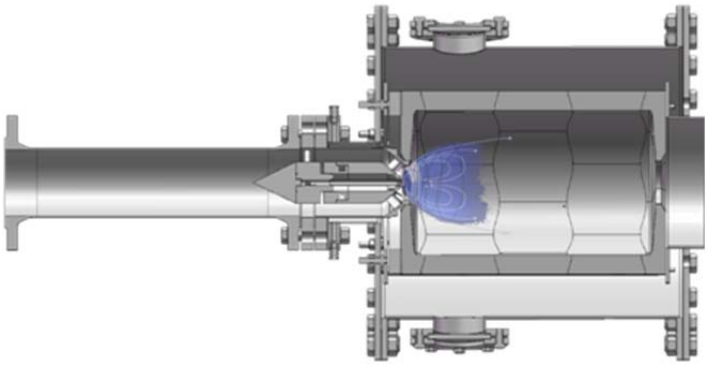

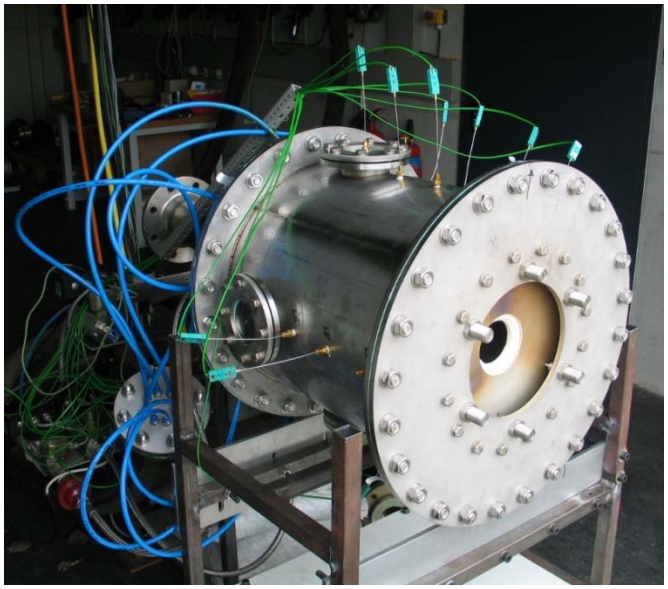

ZARM lean pre-mixed drill stabilized burner (bottom left) and experimental combustion chamber to exermine the influence of sound absorbing porous ceramic on thermoacoustic instabilities.

Gas-turbine combustion has faced the occurrence of thermoacoustic instabilities with the ongoing improvement in NOx-reduction through operation in the lean premixed regime. This problem led to various new researches on thermoacoustic instabilities, to avoid, damp or suppress them. One possible solution is passive damping of sound pressure waves inside the combustion chamber to extract acoustic energy from the feed-back-circuit. Since the environment inside the combustion chamber is challenging, with 1750 K and above of temperature as well as 20 bar of ambient pressure, suitable material is rare. In ZARM, the use of sound absorbing porous ceramic has been investigated.

The work shown here will concentrate on the results of these investigations, e.g. the proof of concept in a single-burner combustion chamber, acoustic modeling for normal conditions and combustion chamber environment and eventually the construction of a high temperature, high pressure impedance tube to validate the simulations.