Objectives

- Gain a better understanding of the interactions of a mean fluid flow and an acoustic field
- Measure the heat flux for a base case flow and a flow with acoustic enhancement
- Evaluate the performance of actively enhancing heat transfer via an acoustic field
- Examine the enhancement effect for both gas and liquid phase

Outlook

- Carry out further investigations at additional parameters
- Proceed to testing of liquid flow on a smaller scale
- Develop correlations for acoustically enhanced heat transfer of fluid flows
- Investigate influence of acoustical fields on heat transfer in two-phase flow regime

Experimental Setup - Air

Conclusions

- The experiments have shown that the heat transfer can be enhanced significantly with an acoustic field
- The effect of the sound field depends on frequency and sound level, whereas further parameters cannot be excluded
- To examine in further experiments:
  - Overall system performance gain or loss through energy balance
  - Influence of acoustical fields on heat transfer in two-phase flows

Selected Publications

- Vainshtein, P., et al., Int. J. Heat Mass Transfer. 38, 1995

FIGURE 1: CAD-model of prototype test setup

FIGURE 2: Dimensionless heat transfer enhancement plotted against the frequency at various sound levels