

## Semester project or master thesis

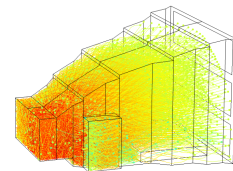
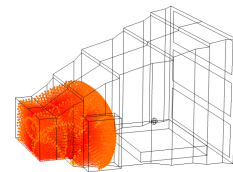
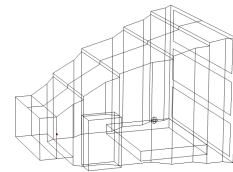
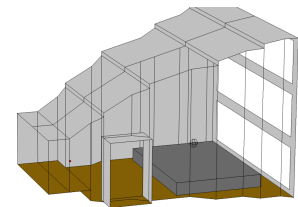
# Development of an STI mapping in room acoustics for the simulation of speech intelligibility and integrating psychoacoustics

### Topic

In the acoustic design of concert halls, auditoriums and open-plan offices, speech intelligibility (STI) plays a decisive role in evaluating the quality of a room from an acoustic point of view. The speech intelligibility index has established itself as an attractive parameter in the scientific environment.

For an effective design of such rooms, simulation models are used to lay out room design and interior construction at an early stage and to define optimal conditions even before the actual construction. Here, the so-called ray-tracing method is state of the art, which considers acoustics as an analogy to optics. The adjacent illustrations show the propagation of sound rays in a concert hall at  $t_0 = 0\text{s}$ ,  $t_1 = 5\text{ms}$ , and  $t_2 = 30\text{ms}$ .

The task of the project includes the further development of an existing simulation models to enable STI mapping and to include psycho-acoustic parameters. For this purpose, the simulation tool Comsol Multiphysics together with Matlab is available. The goal is to visualize an STI landscape in a simplified model of an office.



### Tasks

- Literature review
- Analysis of existing concepts and/or new or further development
- Construction of a simple test bench mark

### Requirements

- High interest in the subject of vibro-acoustics
- High interest in numerical methods and simulations
- High interest in speech transmission
- General interest in speech transmission
- Knowledge in Matlab/Python

**English or German language is possible for this thesis.**

### TUM Contact Person

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