P H Y S I C A L   C O L L O Q U I U M

I N V I T A T I O N

Monday, 30.05.2022, 4.15 p.m., Room W02 1-148 and per
video conference: **https://meeting.uol.de/b/anj-2vc-j6s-fwe**

speaks

Dr. rer. nat. Jan Rennies-Hochmuth,
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about

"Investigating and modeling binaural speech perception in complex listening conditions"

Recognizing speech in adverse listening conditions is a challenging task, primarily due to interfering noise and late reflections or reverberation. In contrast, early reflections in reverberant rooms can support speech understanding because they can, at least in part, be integrated with the direct sound arriving from the talker along the shortest propagation path. The distinction between early (assumed useful) and late (assumed detrimental) reflections is one of the most widely applied concepts in acoustics to characterize rooms and communication scenarios. The first part of this talk will present different psychophysical experiments challenging this concept. By systematically manipulating the temporal position as well as the binaural information of individual reflections, the relative contribution of early and late echoes to speech recognition was explored. Contrary to room acoustical standards, these experiments (together with analyses based on psychophysical prediction models) clearly show that the healthy auditory system is capable of exploiting information even if it is conveyed by reflections arriving much later than the typically assumed temporal integration window. Complementary data of hearing-impaired listeners highlight the yet unsolved challenges of predicting individual speech recognition performance in challenging listening conditions. The second part of the talk explores the specific challenges introduced by competing talkers which, in addition to energetically masking the target speech, compete for attentional resources and can therefore produce considerable additional communication problems. Driven by the ecological relevance of speech-on-speech masking, many studies have investigated the role of various "unmasking cues" that contribute to the amazing capabilities of the normal auditory system to focus on a particular talker in a multi-talker scenario.

One experimental difficulty to better understand the underlying perceptual mechanisms, however, is to disentangle the role of different concurrent tasks that need to be completed for successful speech recognition (identifying the target talker, segregating the target talker's utterances from the mix, piecing together the available target speech information into a coherent speech stream, ...). This talk will present an experimental approach which, despite its simplicity, may shed some light onto the contribution of the different tasks and unmasking cues on our way towards developing better prediction models and speech enhancement technologies.

All interested persons are cordially invited.

Prof. Dr. Dr. Birger Kollmeier