

Announcement of Senior Course of Acoustic Talent Plan of Nanjing University Shenzhen Research Institute

The enrollment of the ninth senior course of acoustic talent plan(ATP) is now starting in Shenzhen. The ATP is proposed by Prof. Yong Shen in Nanjing University since 2013.

The electro-acoustical transducers used in headphones, smartphones and other personal audio equipment show particularities that are not found in woofers, tweeters and other drivers intended for conventional audio applications. Recent research activities have yielded advanced transducer models which consider linear, nonlinear and time variant properties and other vibration that generate undesired noise and distortion (rub & buzz) in the sound output. This master-class gives an overview on the physical root causes related to the geometry and material used in those kinds of transducers and their representation in a physical model based on lumped and distributed parameters. Important measurement techniques required to describe the transfer behavior of the loudspeakers by characteristics defined by international standards (IEC) are discussed. This information is not only crucial for passive transducer design but also for active systems where digital signal processing is used to increase sound output, quality, efficiency and to protect the transducer against overload. Finally, the audibility of the signal distortion and their impact on the reproduced sound quality are investigated by modern auralization techniques and systematic listening methods.

1. Recruiting Information

Engineers have College degree or above or have been working for more than 5 years in the field of acoustics. Engineers of the audio industry active in research & development, manufacturing and quality control, students in the graduate program of the Electro-Acoustics (please see requirements on page 2)

2. Teaching Modes

Although Prof. Klippel speaks in English, the most important and critical parts will be translated into Chinese. All PowerPoint slides are bilingual and will be provided to the attendees. Sufficient time will be reserved for discussion which will be translated into both languages.

3. Course Time and Address

Time: November 3rd, 2017, 9:00 a.m.-5:00 p.m. (8 classes, 1 days).

Address: Shenzhen.

4. Course Curriculum

Microspeaker and Headphone Transducer Design by Prof. Wolfgang Klippel.

During the course the following points are discussed:

1. Comparison between microspeakers, headphone, woofers, shakers and conventional transducers
2. Particularities of microspeakers and headphones not covered by traditional modeling
3. Need for an extended model based on lumped and distributed parameters
4. The role of numerical simulation tools (network, FEA, BEA,)
5. Mechanical vibration (creep, rocking modes, higher-order modes)
6. Sound radiation (effective radiation area S_d , cancellation effects)
7. Regular nonlinearities (deterministic, can be modeled and predicted during the design process)
8. Measurement and interpretation of the nonlinear parameters and prediction of the nonlinear distortion
9. Irregular nonlinearities (voice coil rubbing, buzzing, noise generation, defects) which are not predictable
10. Sensitive measurement of irregular distortion (rub & buzz) during design and manufacturing
11. Detection of defect units, identification of the root cause and solving the problem
12. Evaluation of portable and personal audio devices in the target application (with music)
13. Perceptual evaluation of the distortion (audibility, degradation of sound quality)

The participants are encouraged to send questions and to suggest additional topics which should be included in the workshop via E-Mail to j.klaue@klippel.de

5. Fees:

Course fees: RMB 1,000 Yuan/Person (including the registration fees, training fees, and cost for course materials etc.). the Group Price for 5 persons is RMB 4,000 yuan/5 persons.

Accommodation is not included.

6. Training Certificate

After the course, the Senior Course Certificate of Acoustic Talent Plan of Nanjing University Shenzhen Research Institute will be issued to the students.

7. Registration

Time: 2017.9-2017.11

Please send the Registration Form to iseatorg@vip.126.com.

8. Contact Information

Contact Institution: Acoustic R&D center of Nanjing University Shenzhen Research Institute.

Address: 8th floor, Area B, Shenzhen Institute of industry-university-research, Nanjing University, High-tech Industrial Estate, Nanshan District, Shenzhen, 518057, P.R.China

Contacts: Mr.Lu Email: iseatorg@vip.126.com Tel: 0755-2655 1977

9. Requirements:

This one-day Master-class satisfies the needs of transducer and system engineers working with microspeakers, headphones and similar transducers. Due to the limited time, this master class focuses on the particular problems that are interesting for experts in this field. There is not much time left to explain theoretical fundamentals and modern concepts of electro-acoustical modeling, measurement and transducer diagnostics. Interested students and engineers with less experience in the audio field are strongly recommended to attend the three-day lecture on "Sound quality of Audio Systems" that will be conveniently be presented at the Taichung Feng Chia University (Taiwan) a few days before the Master-class, from 30th October to 1st November 2017. This three-day lecture allows for the explanation of the general concepts in greater detail and for more practical experiments, exercises and discussions in small groups. However, the lecture will not address the particularities of headphones and microspeakers in detail.

Contact Information for Taiwan 3-Day-Lecture:

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Nanjing University Shenzhen Research Institute

Senior Course of Acoustic Talent Plan Admission Office

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