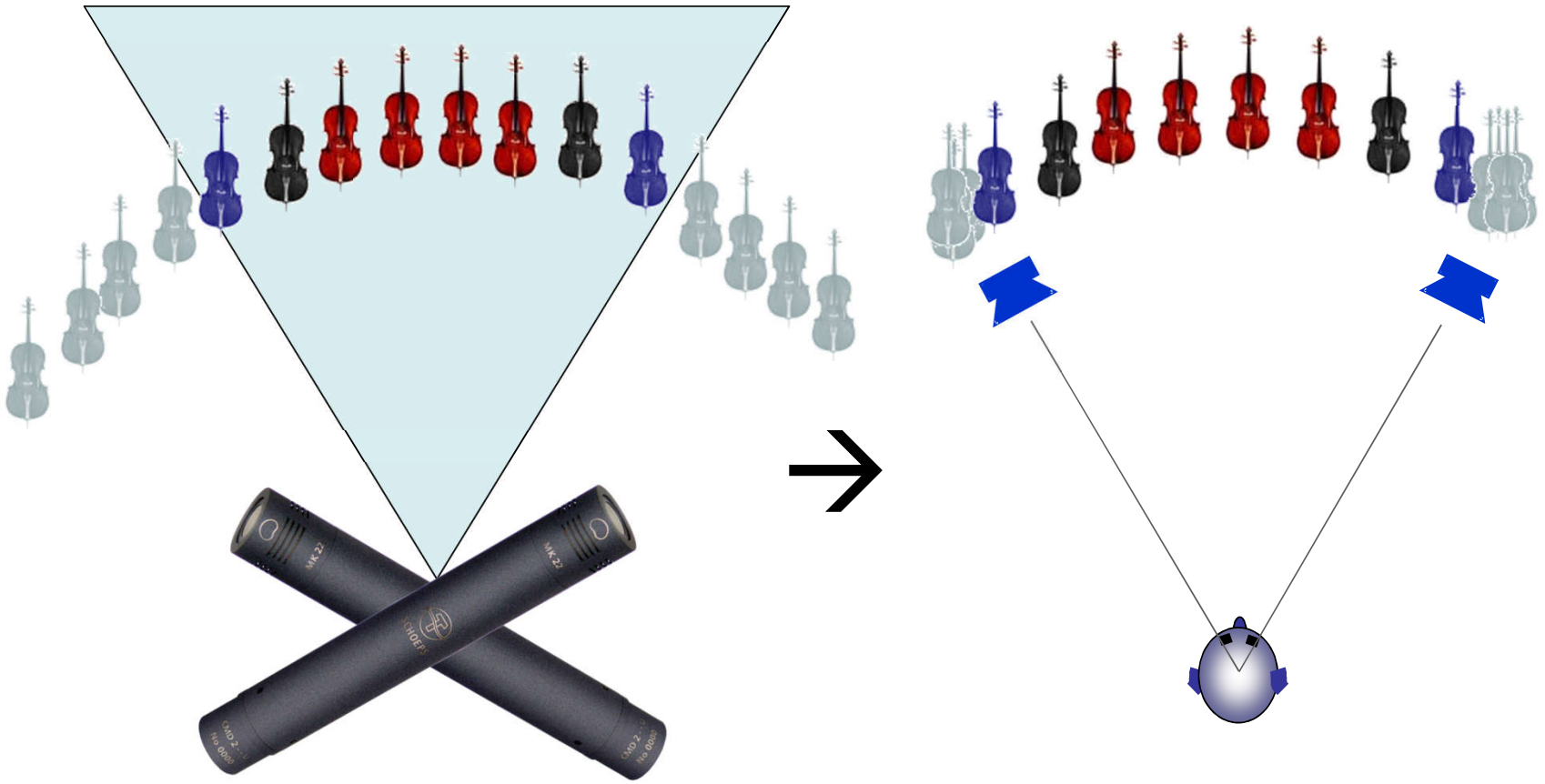
Stereophonic multichannel recording techniques for 3D-Audio and VR

AUDIO AES MILAN 2018

Helmut Wittek

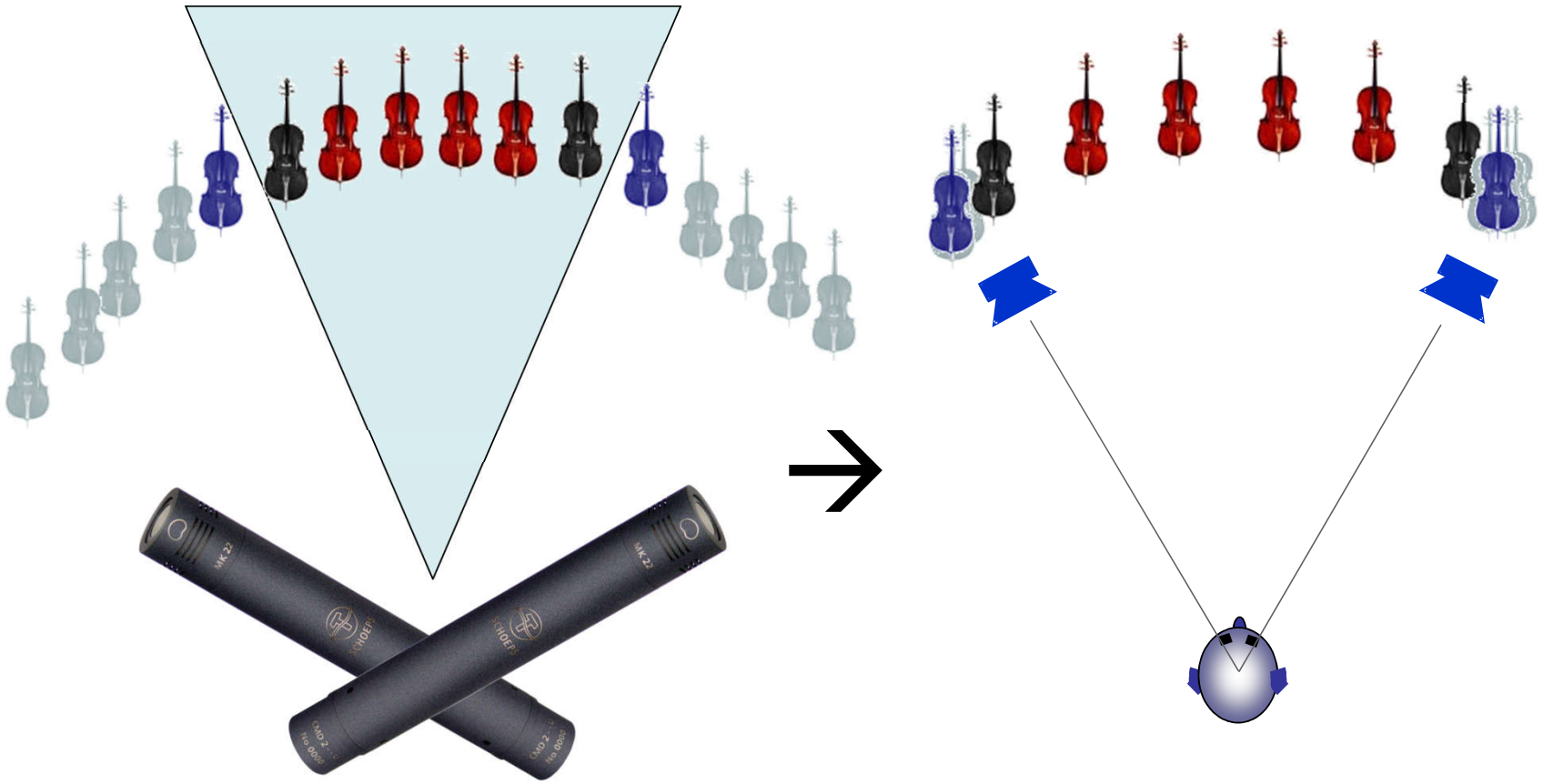
24.05.2018

Recording Angle



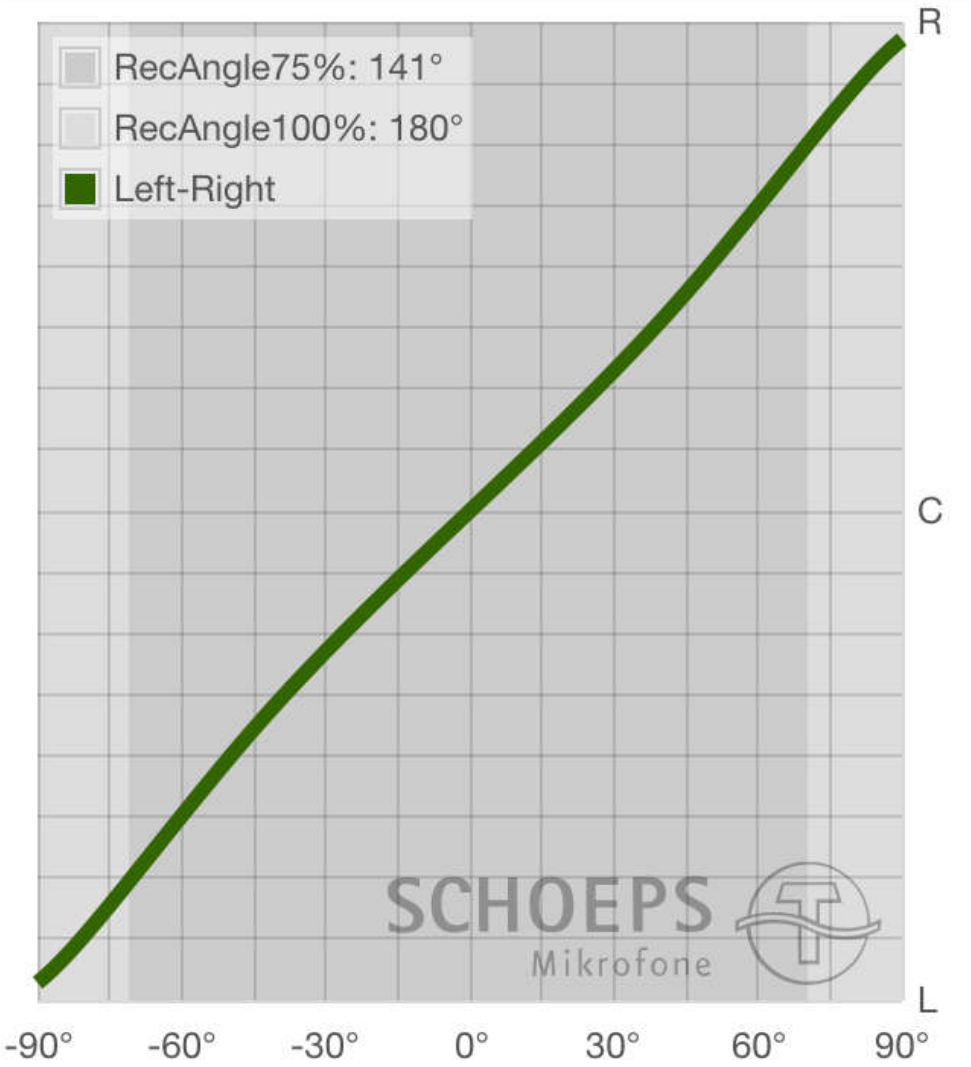
SCHOEPS Mikrofone

Recording Angle



SCHOEPS Mikrofone

Localisation curve



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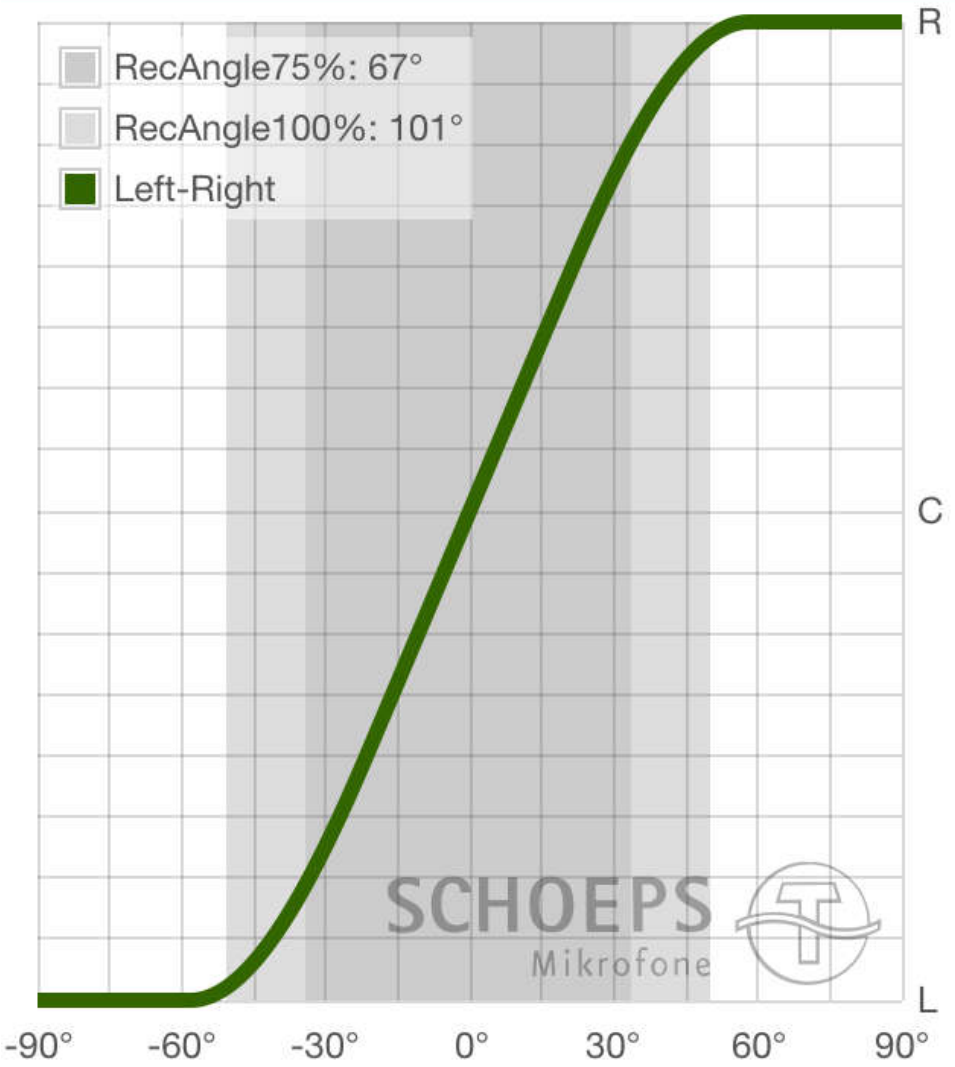
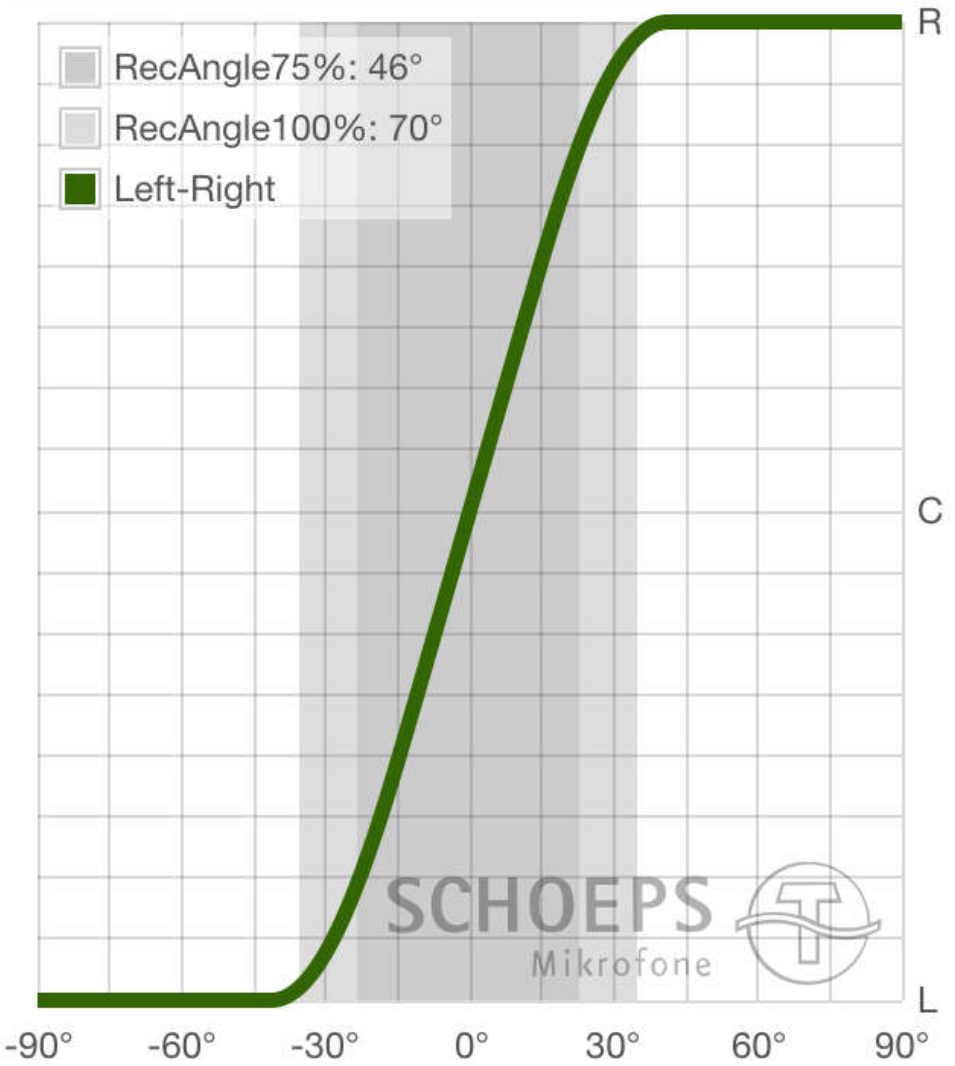
Localisation curve



SCHOEPS Mikrofone

Localisation curve



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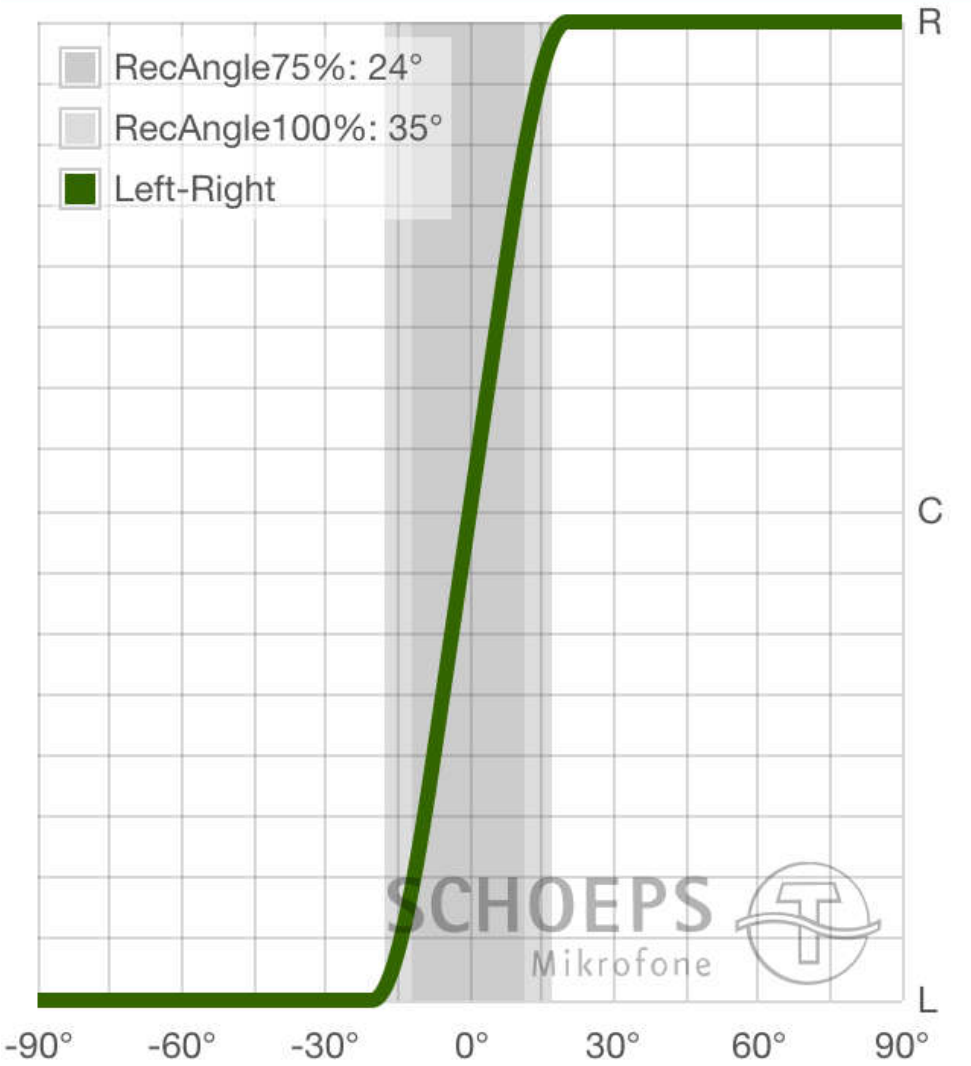
Localisation curve



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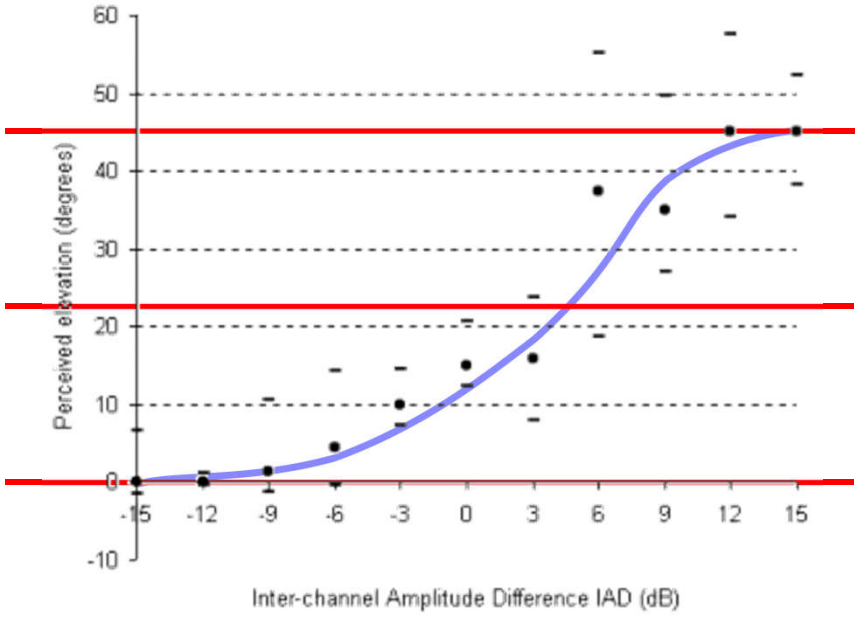
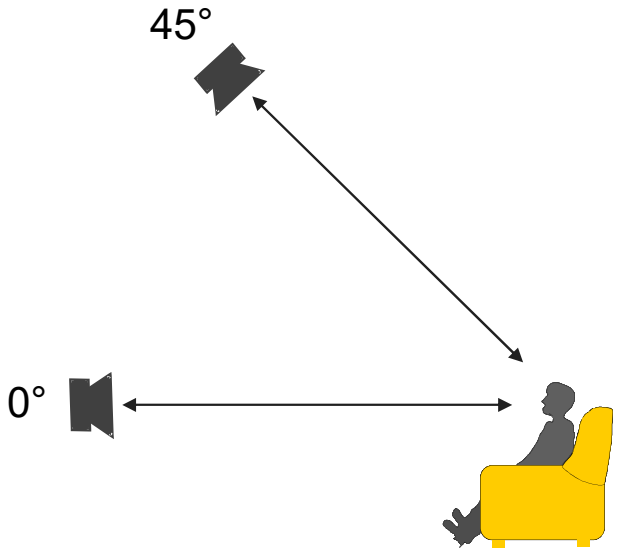
Localisation in the vertical domain



high

middle

low



REF: Jim Barbour, AES

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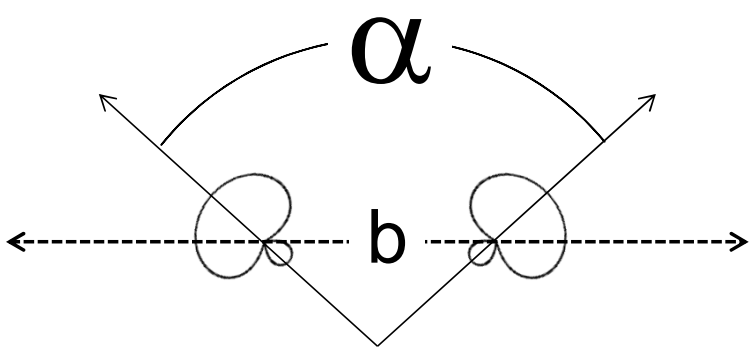
Diffuse field correlation

DFC (α,β,λ)



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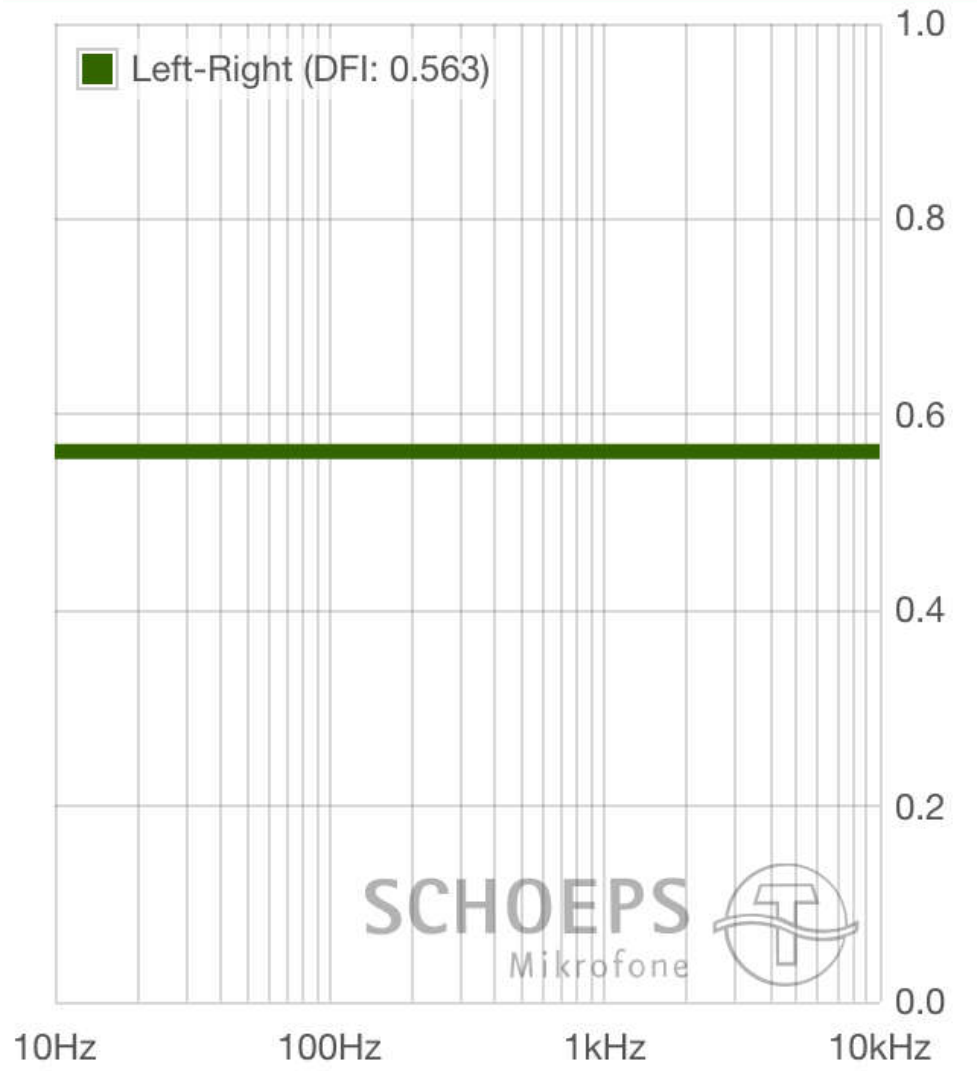
Diffuse field correlation



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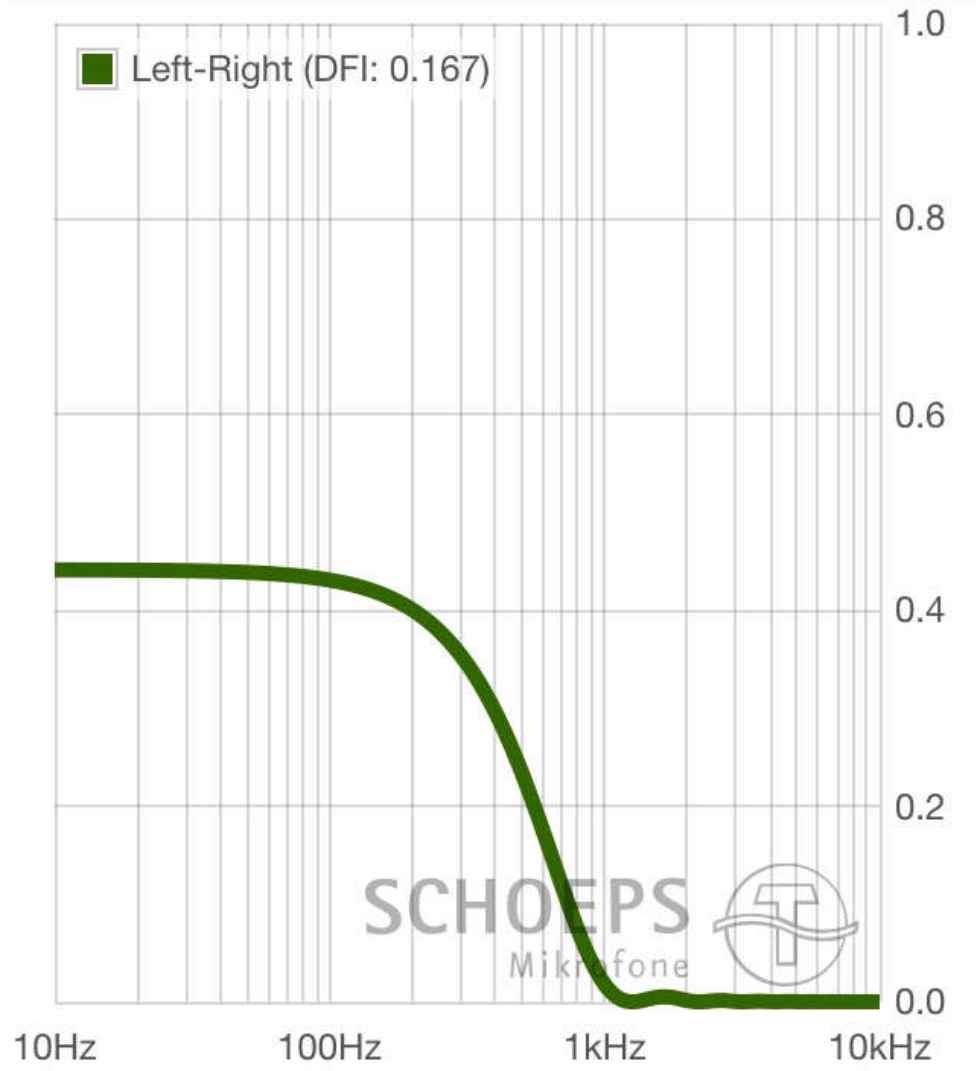
Diffuse field correlation



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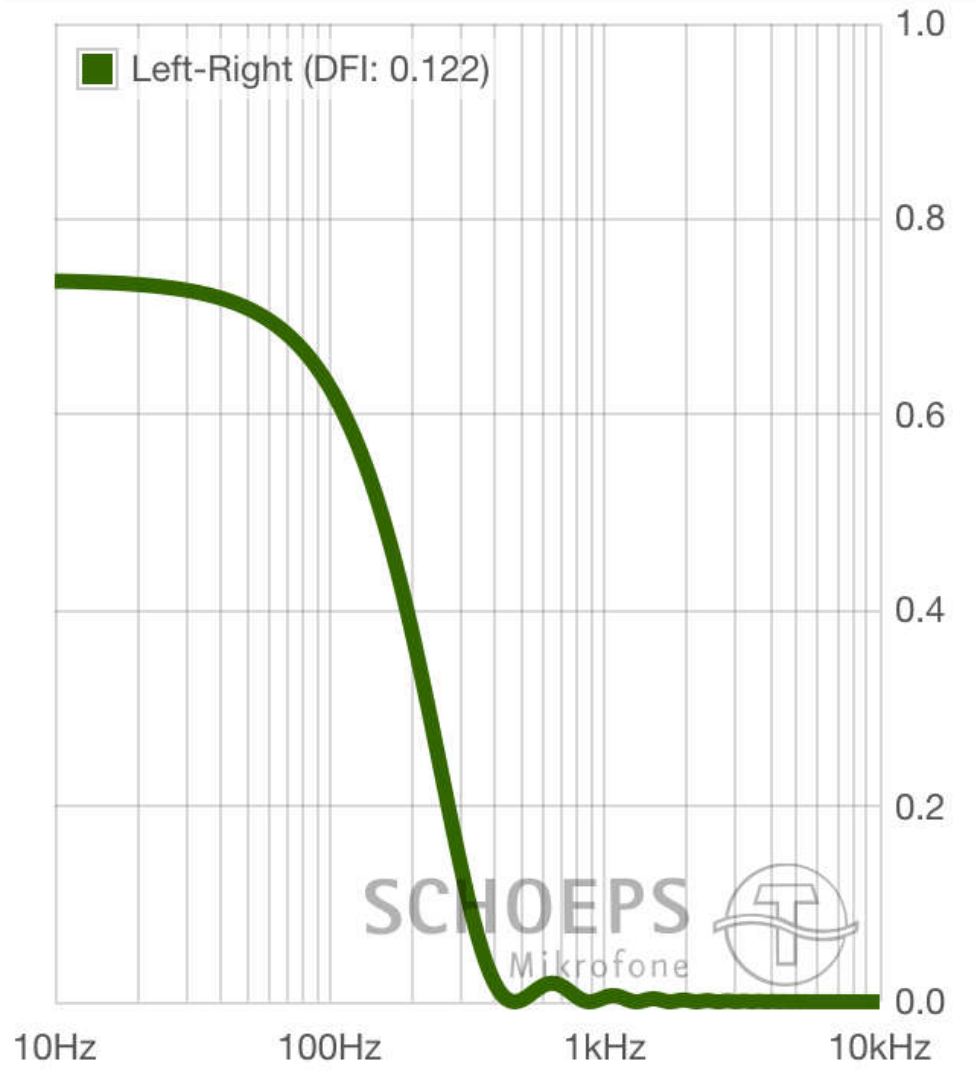
Diffuse field correlation



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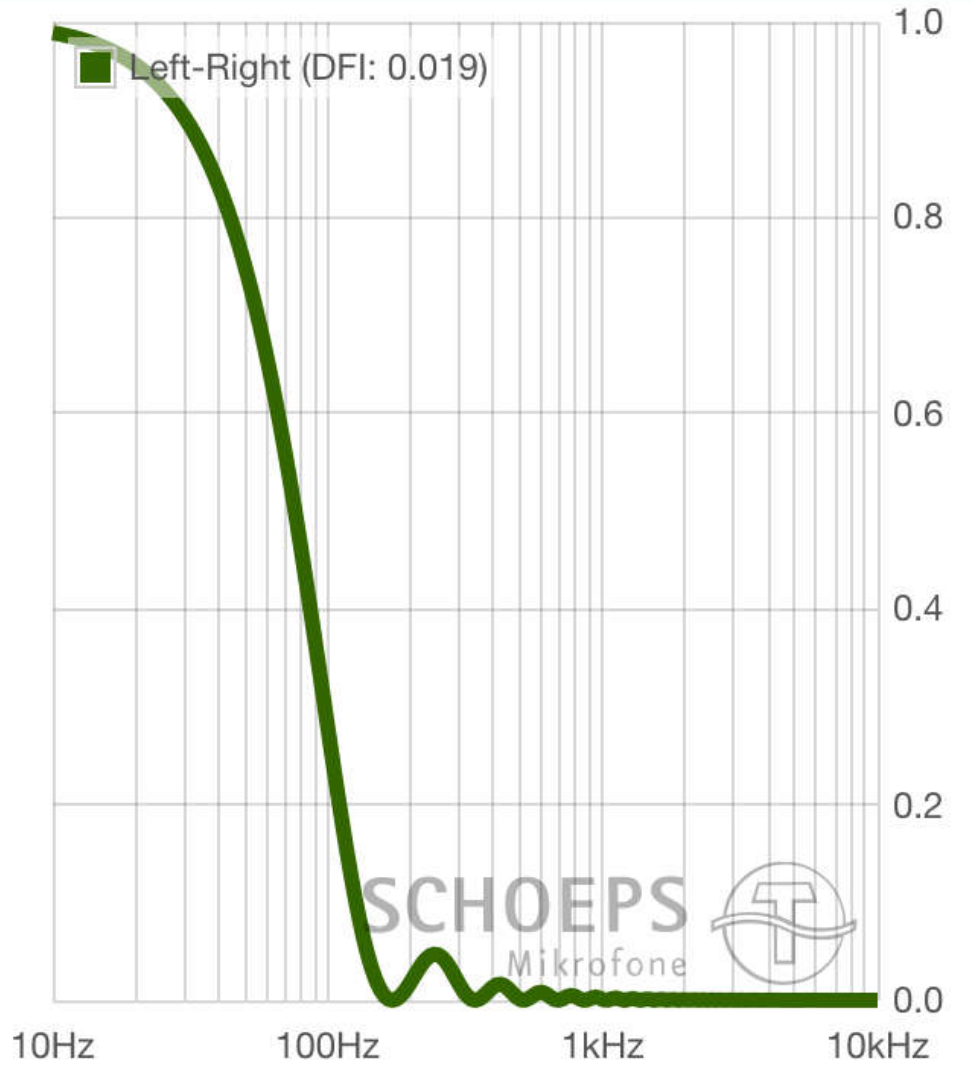
Diffuse field correlation



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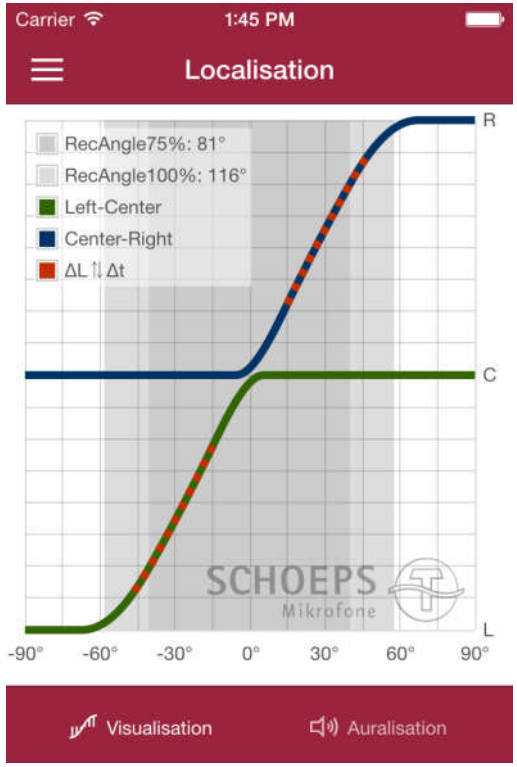
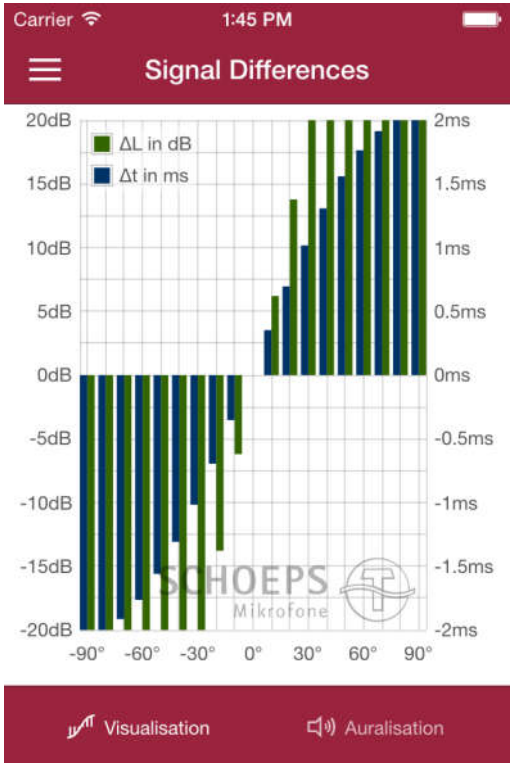
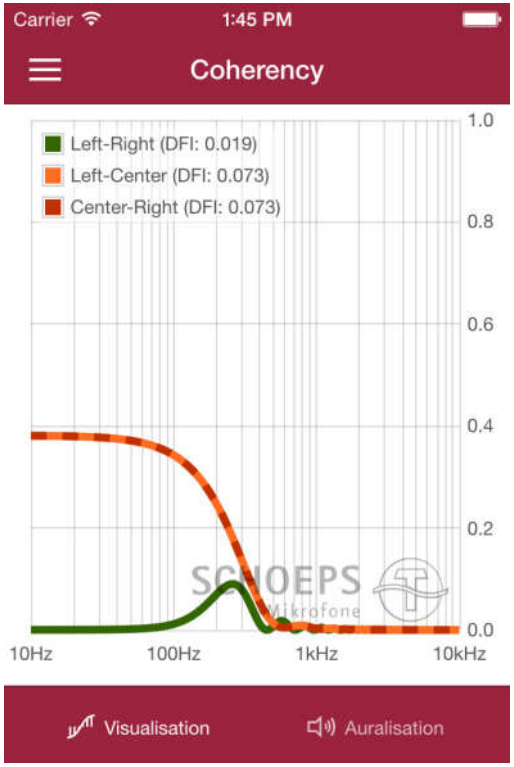
SCHOEPS-App “Image Assistant”:

www.ima.schoeps.de and in the iOS app store







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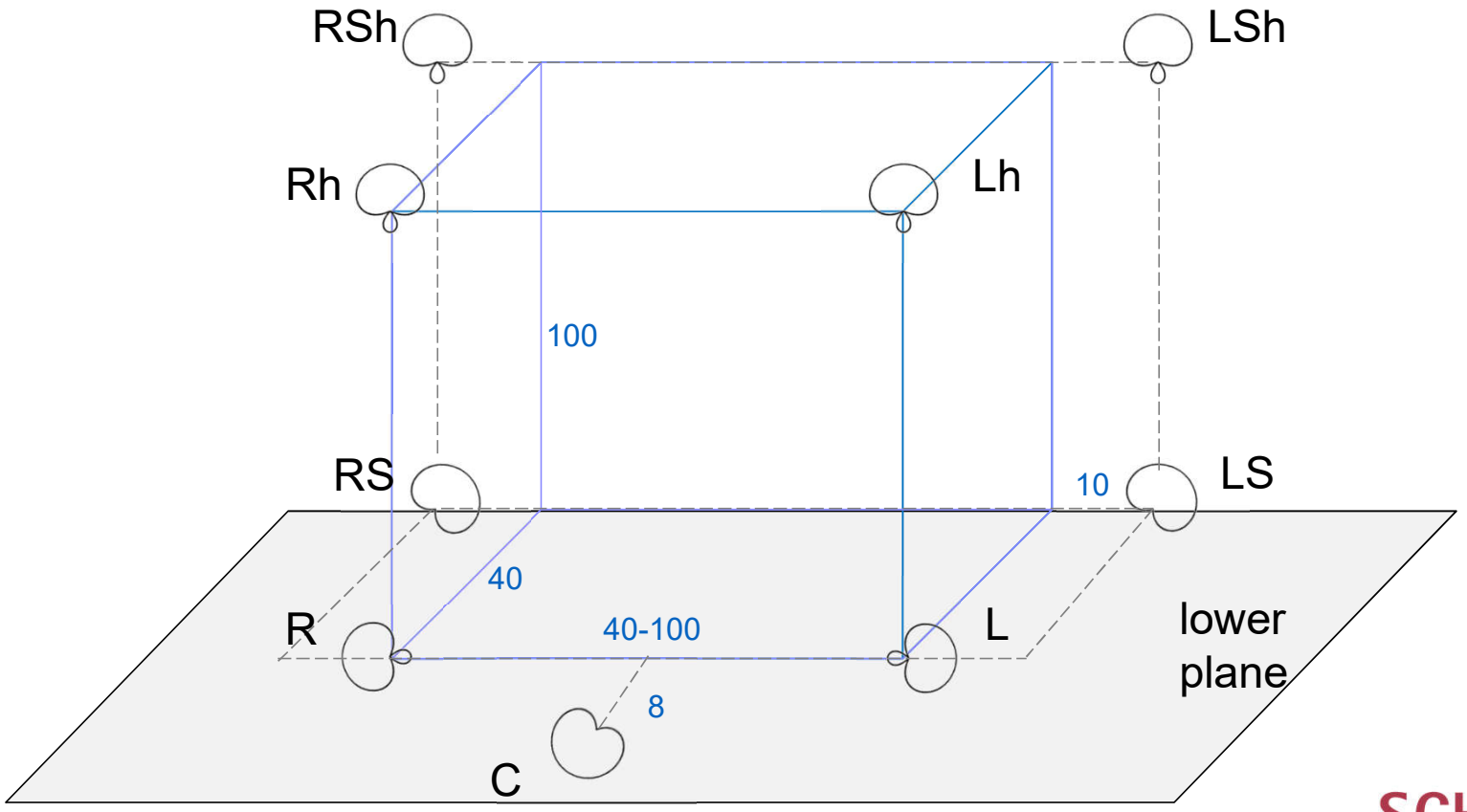
„OCT-3D“ for 3D-Stereo (9.1, 5.1.4, 22.2)

= OCT Surround + 4 Supercardioids for the height plane



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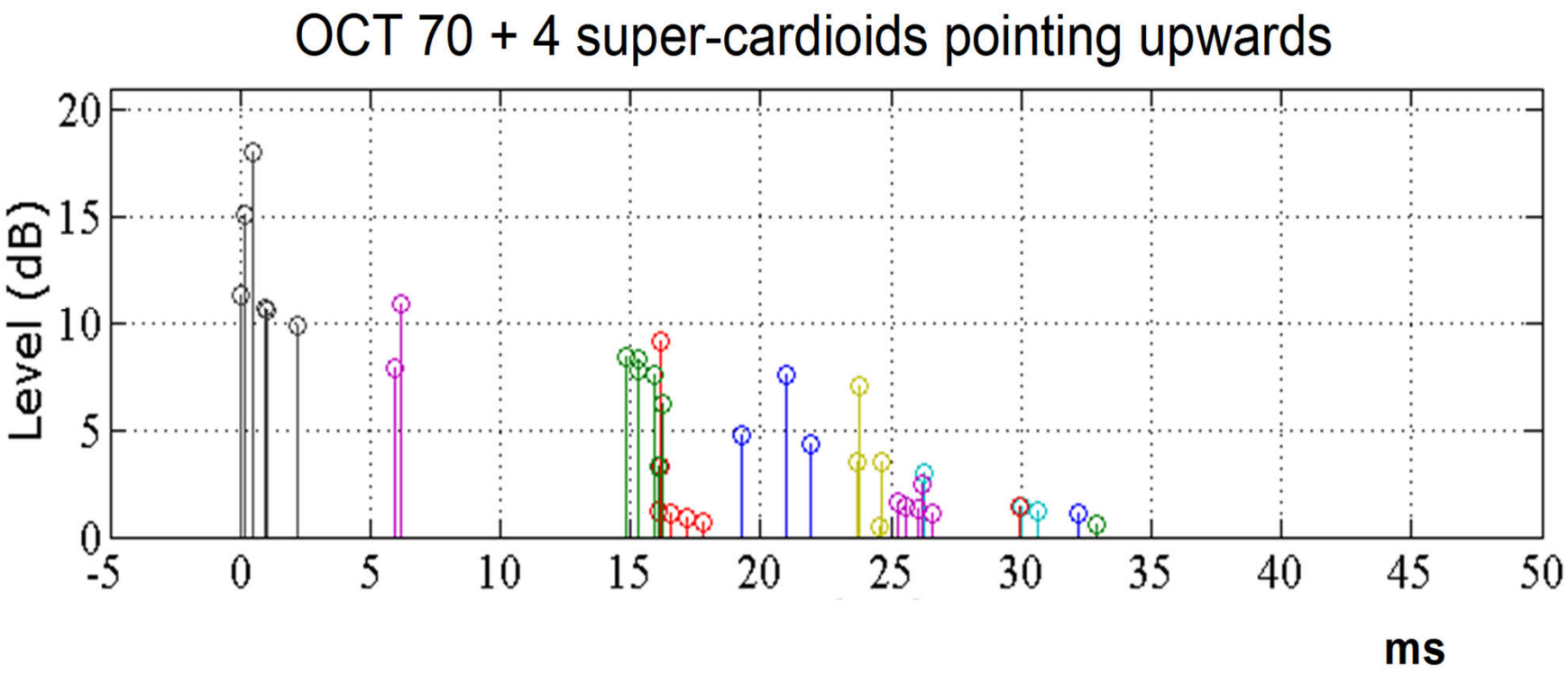
Response of a mic array (direct sound + early reflections)



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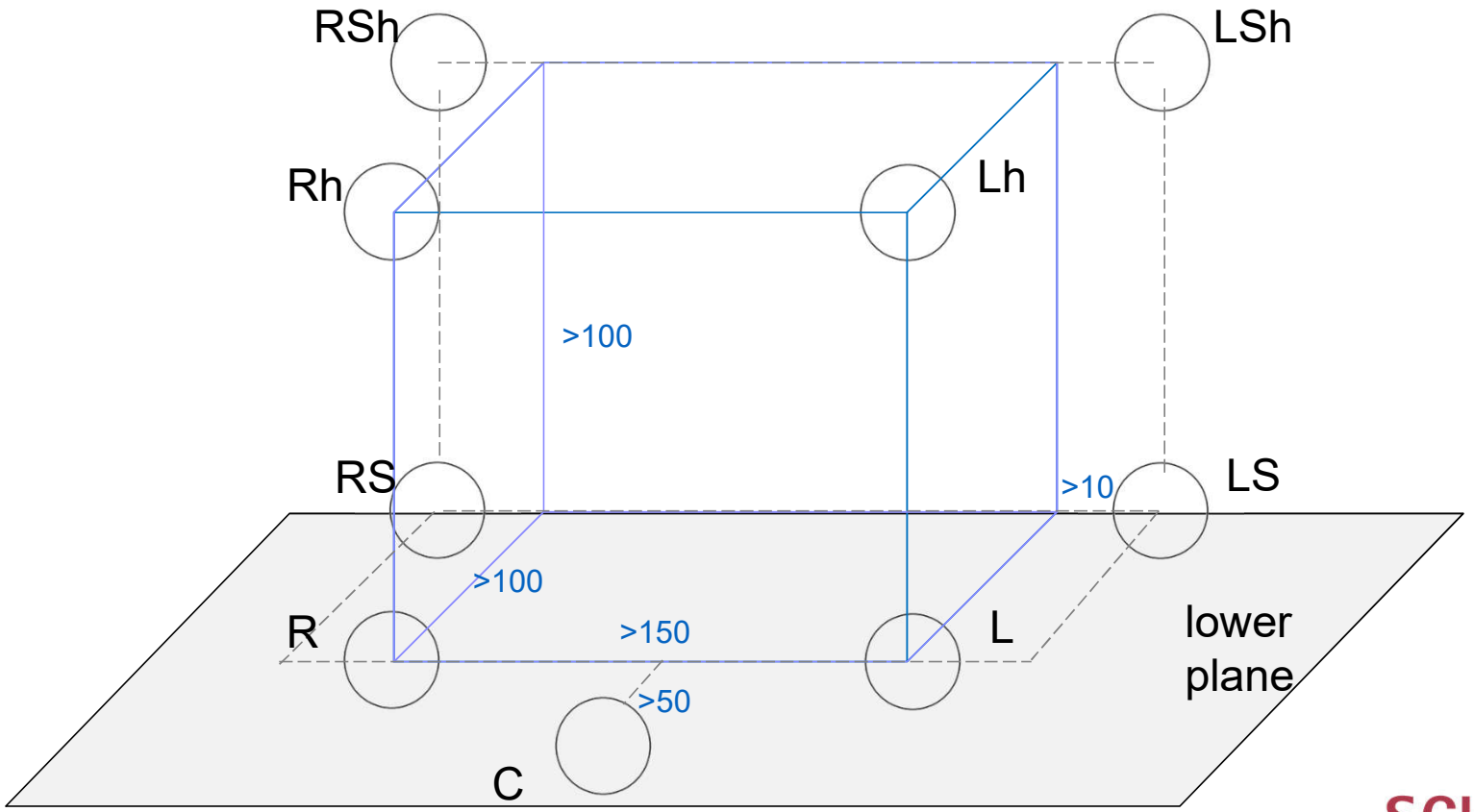
„Omni Array“for 3D-Stereo (9.1, 5.1.4, 22.2)
= 9 omnis with large spacings



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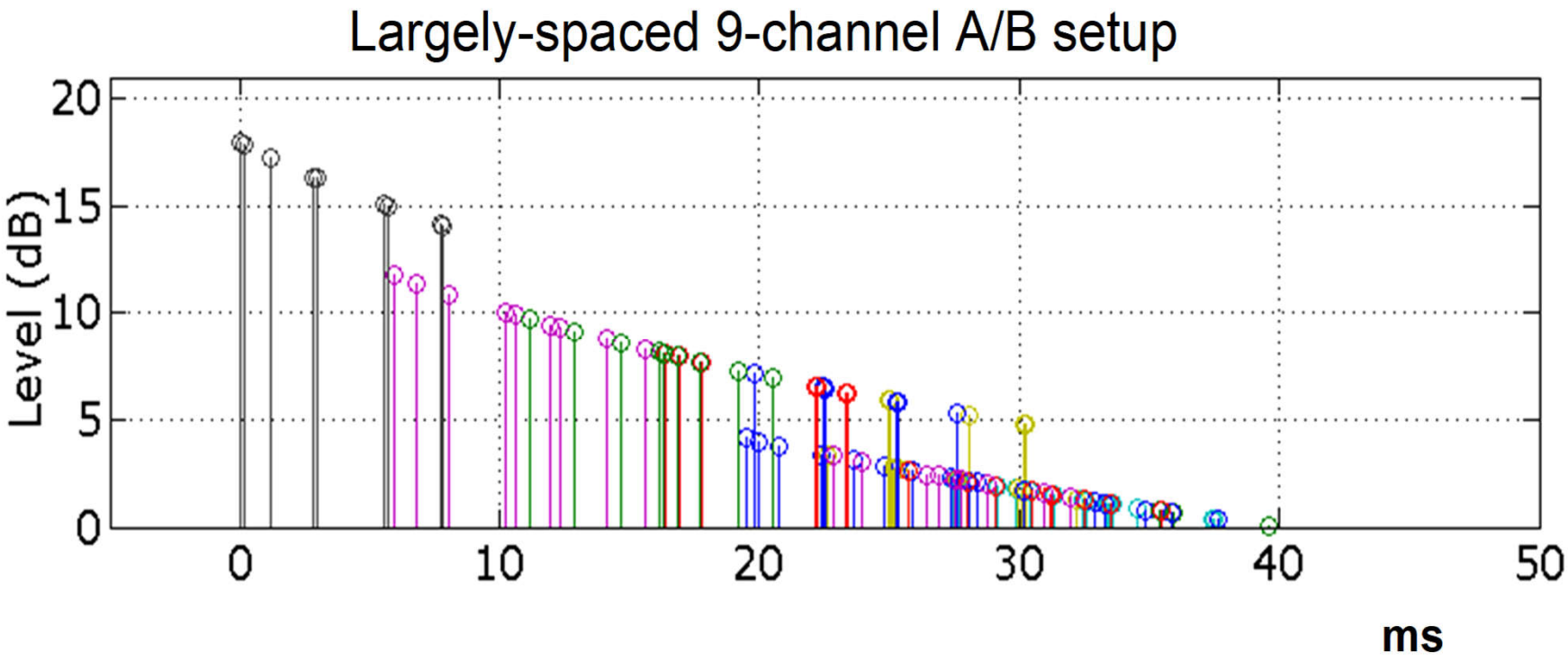
Response of a mic array (direct sound + early reflections)



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Test recordings @ Galaxy Studios, Belgium

- OCT-9
- Omni array


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Double M/S – Surround Sound
riple - MS
Double - MS


Triple - MS

ORTF-3D „symmetrical“

- 8 * supercardioids in the edges of a cube with d = 10-20 cm
- © G. Theile

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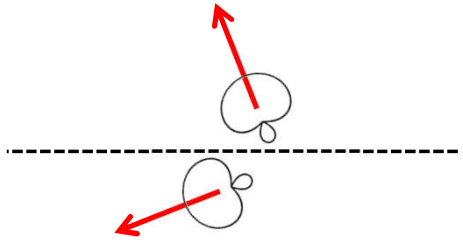
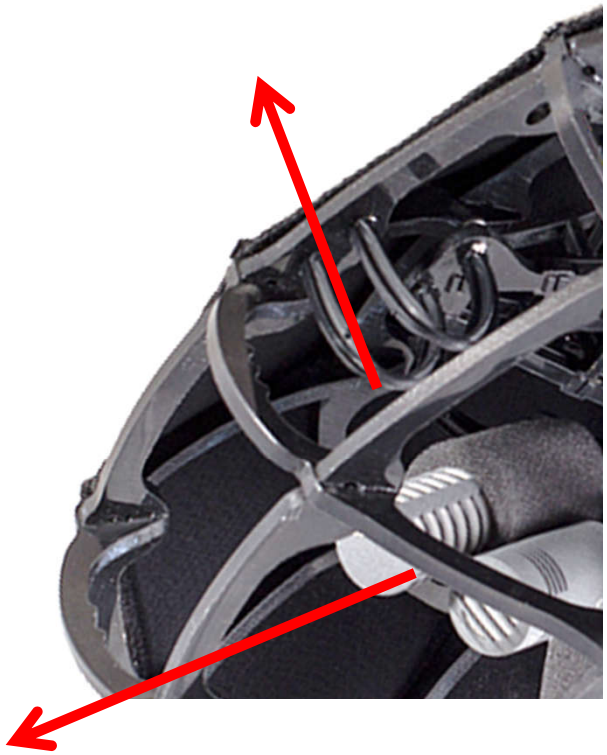
ORTF-3D

- 8 * supercardioids in the edges of a rectangle with d = 10/20 cm
- © H. Wittek after Theile
- Coincident X/Y-pairs for the vertical loudspeaker pairs





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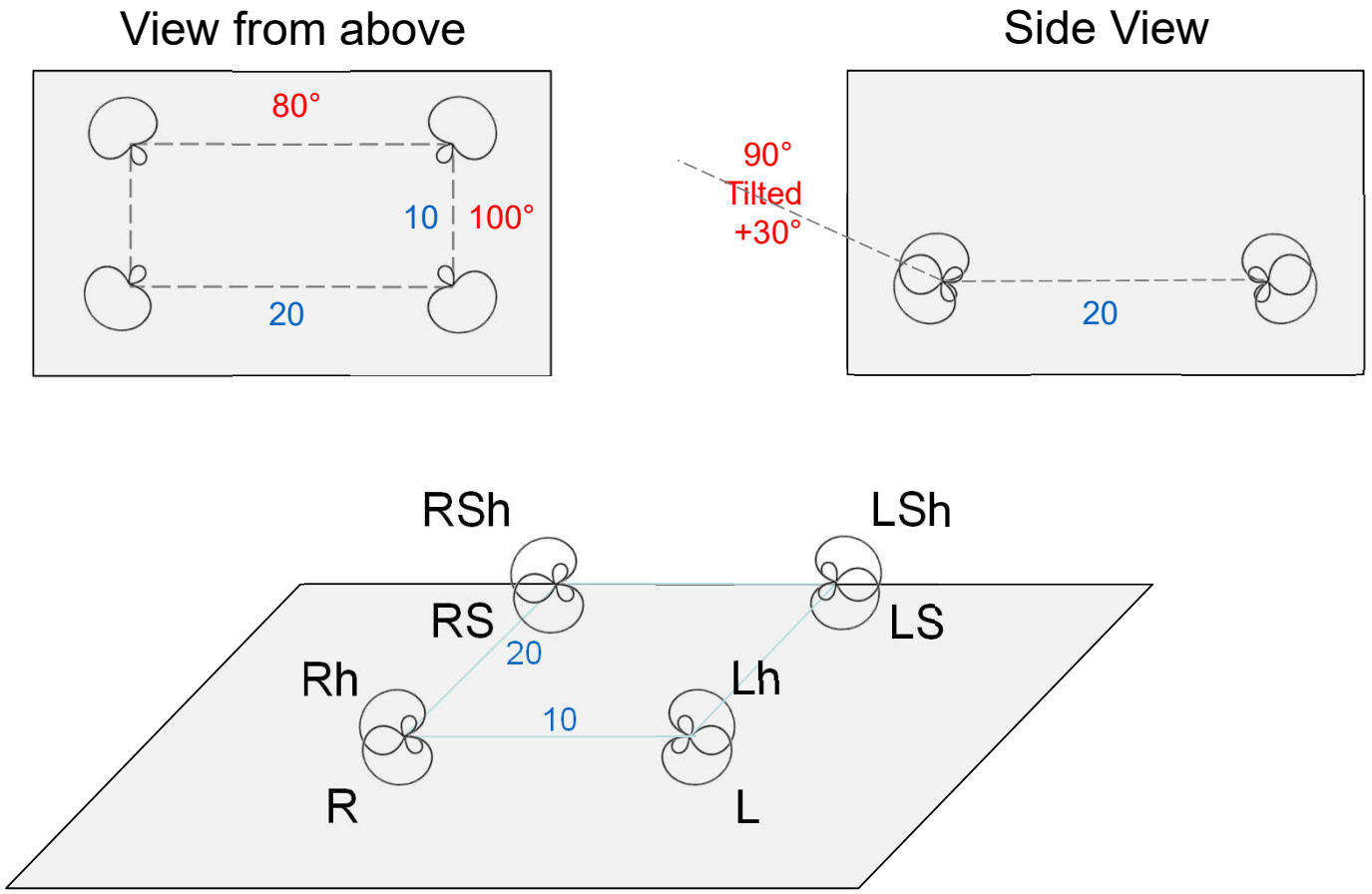
„ORTF-3D“



www.hauptmikrofon.de

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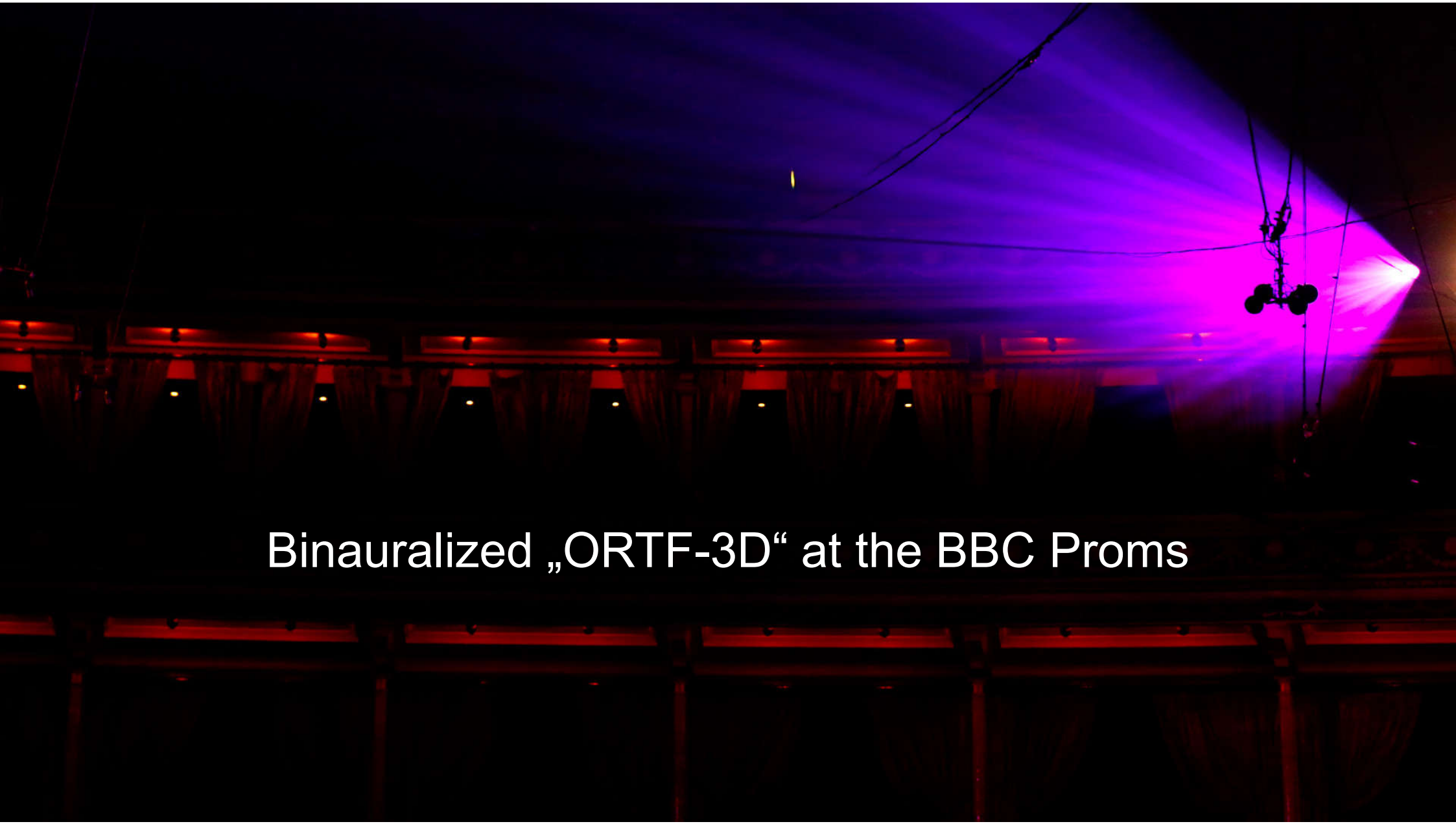
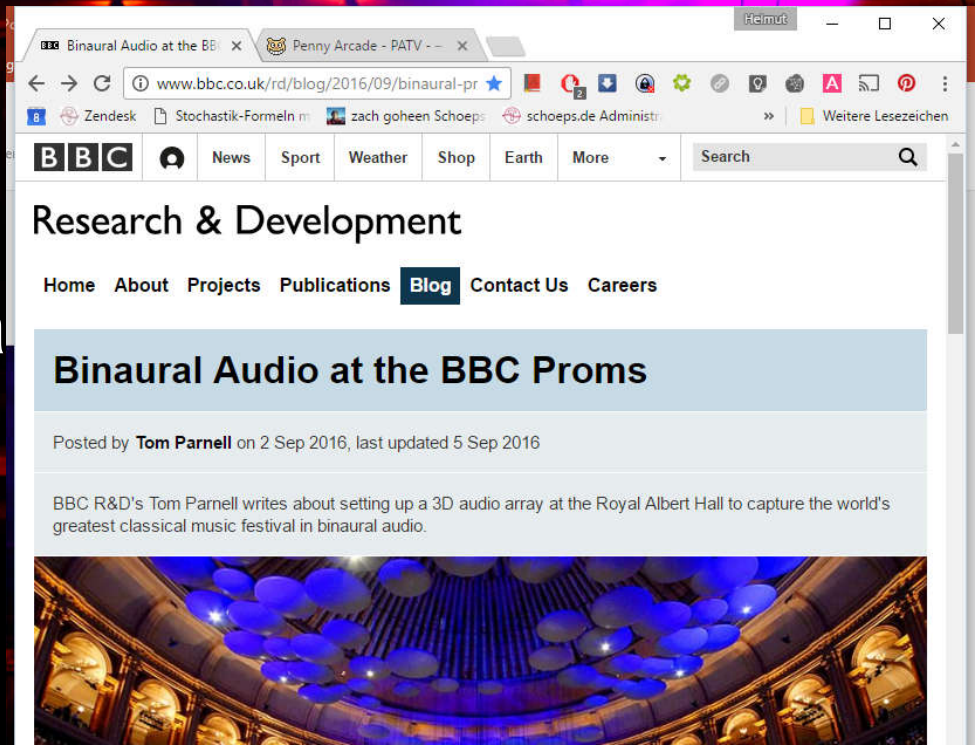
„ORTF-3D“ @ Radio France


Binauralized „ORTF-3D“ at the BBC Proms

Binauralized „ORTF-3D“ a



Signal chain: 3D-Stereo → VR/360°-Video

Microphone array

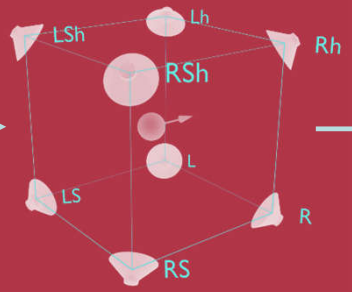
Intermediate format

Ambisonics Encoder

Target format

Output

Stereophonic Array
(e.g. ORTF-3D)



VS2HOA

HOA

YouTube

HOA
Bus Input

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Comparison between FOA and the ORTF-3D in Binaural:

Demo at *SCHOEPS booth* or Download the App (http://www.hauptmikrofon.de/3d/vrapp) or **listen in youtube**

first-order
Ambisonics

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ORTF-3D

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3D-Stereo Mic Techniques for Ambience on

www.hauptmikrofon.de

- Free download
- By Felix Andriessens

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- Youtube talks about SCHOEPS and 3D/VR:
  - https://www.youtube.com/playlist?list=PLRqzOEeUQ2l91Gt-d7a2-wDpp6JTwWD4W
  - https://www.youtube.com/watch?v=GgDn_Ts3aw0&list=PLRqzOEeUQ2l-aWeza-XNqArCbfKGvOGpt&index=2
  - https://www.youtube.com/watch?v=ut9rvTsxeEY&index=5&list=PLRqzOEeUQ2l-aWeza-XNqArCbfKGvOGpt

Conclusions

- Sound engineers: **trust your ears**, don‘t believe in „scientific“ approaches without skepticism
- Use Stereo to be able to work in a sound engineering way, caring for **aesthetical** aspects
- There are plenty possible **3D-Stereo mic techniques**:
  - **ORTF-3D** (or other cubic 8ch level/time difference ambience setups)
  - **OCT-9** (or other 9ch level/time difference setups for front/back scenes)
  - **Triple-M/S** (or other coincident setups)

Thank you!

- wittek@schoeps.de - www.hauptmikrofon.de
- SCHOEPS booth: 360° VR app and ORTF-3D mic!
- SCHOEPS YouTube channel: talks on „Mics for VR/360°“

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