

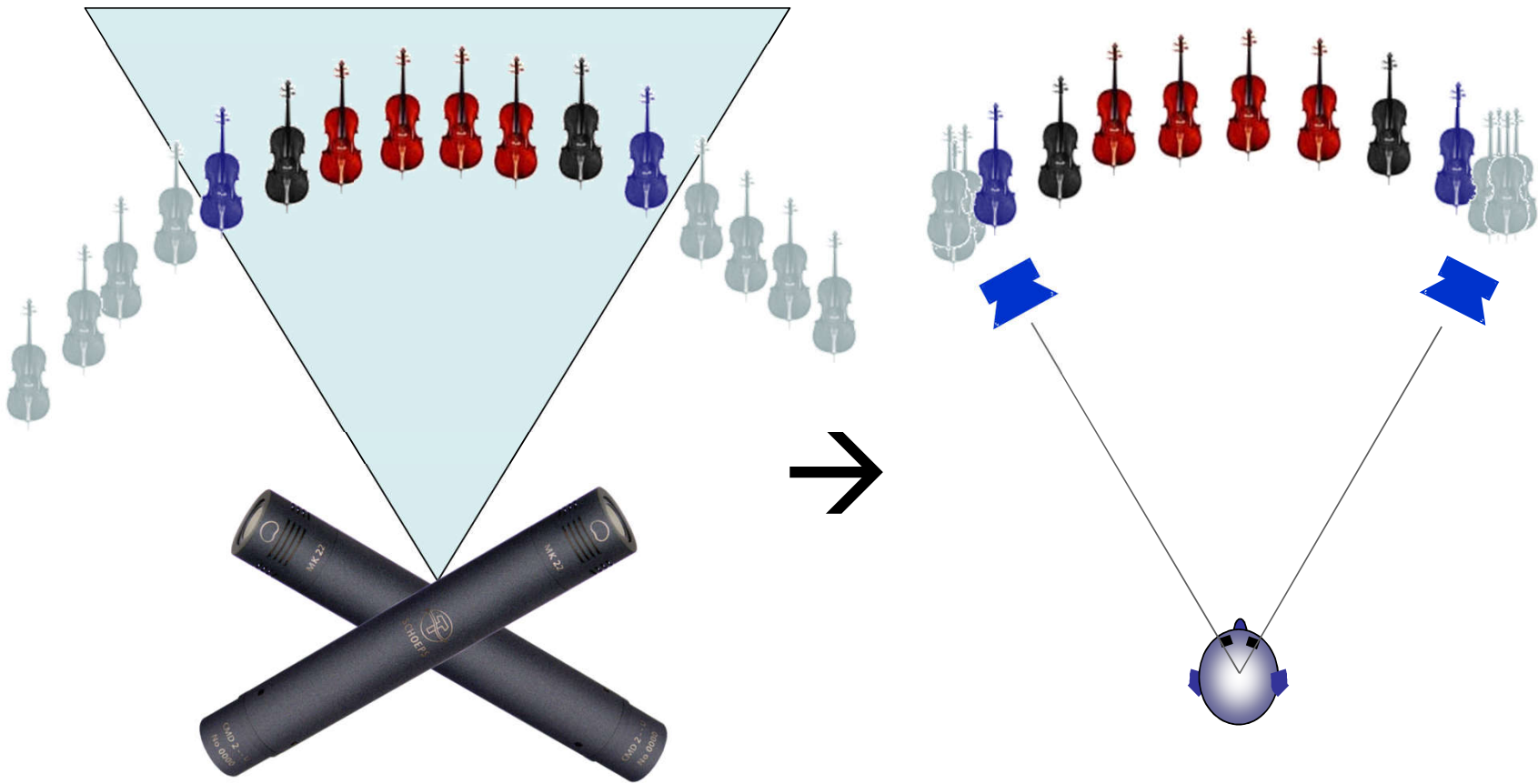
Stereophonic multichannel recording techniques for 3D-Audio and VR



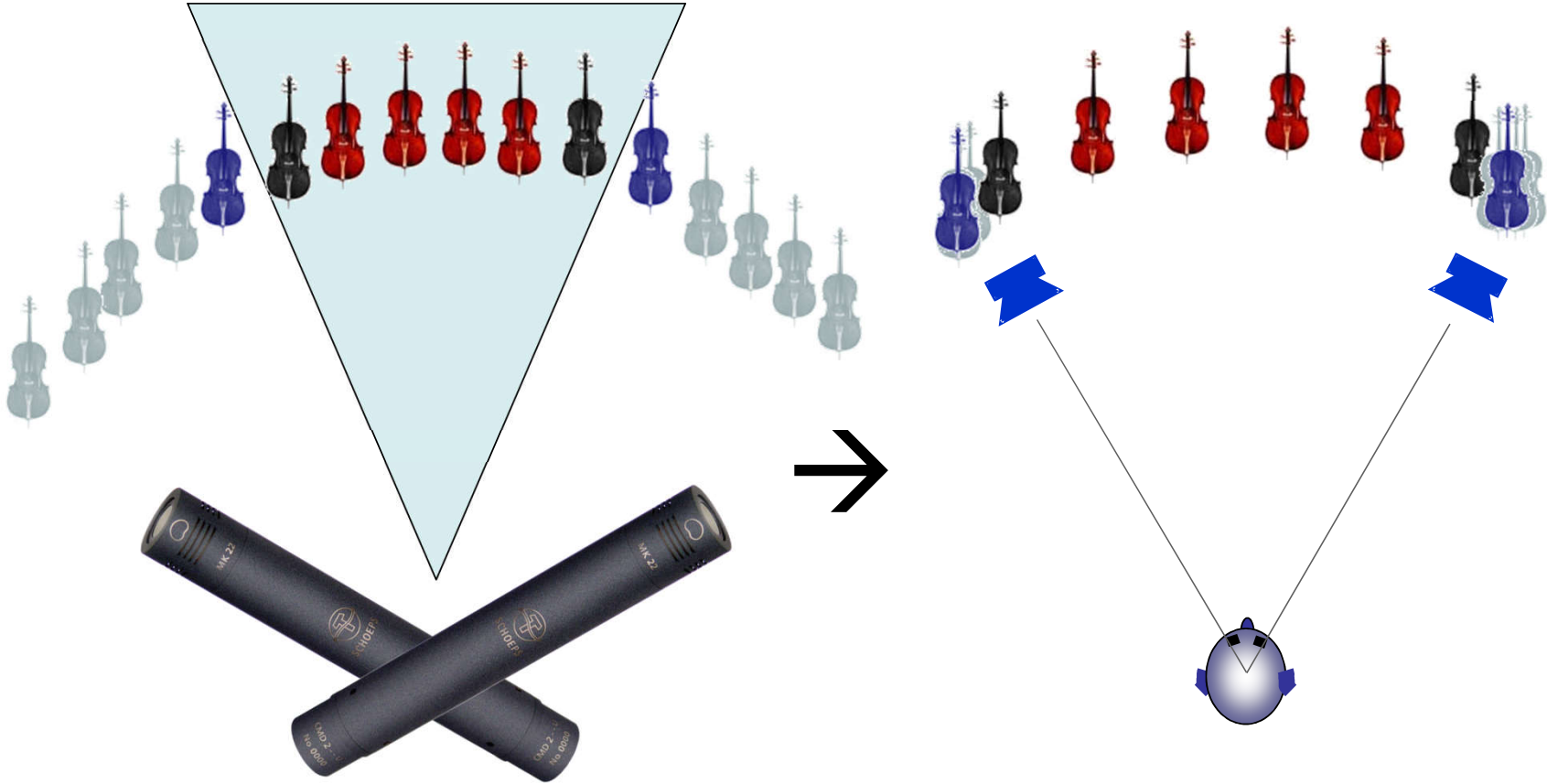
Helmut
Wittek

24.05.2018

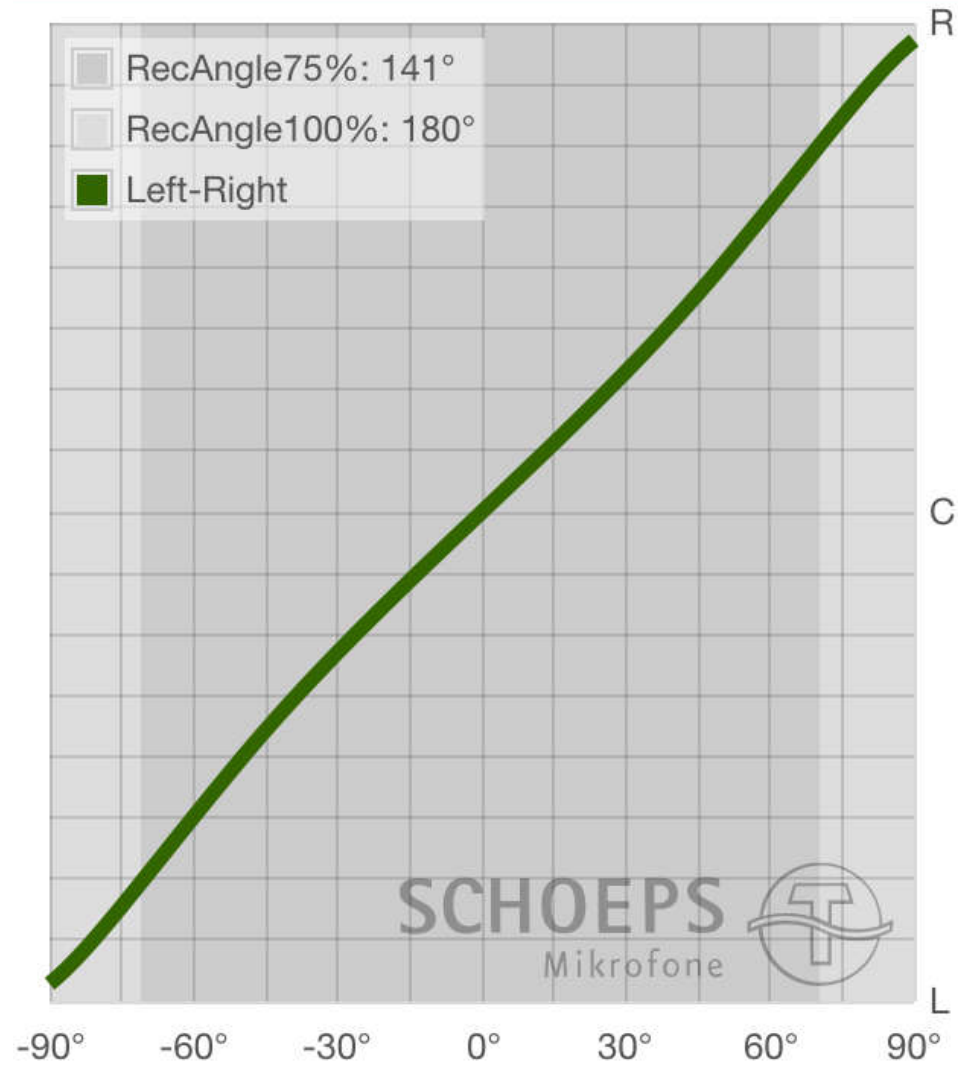
Recording Angle



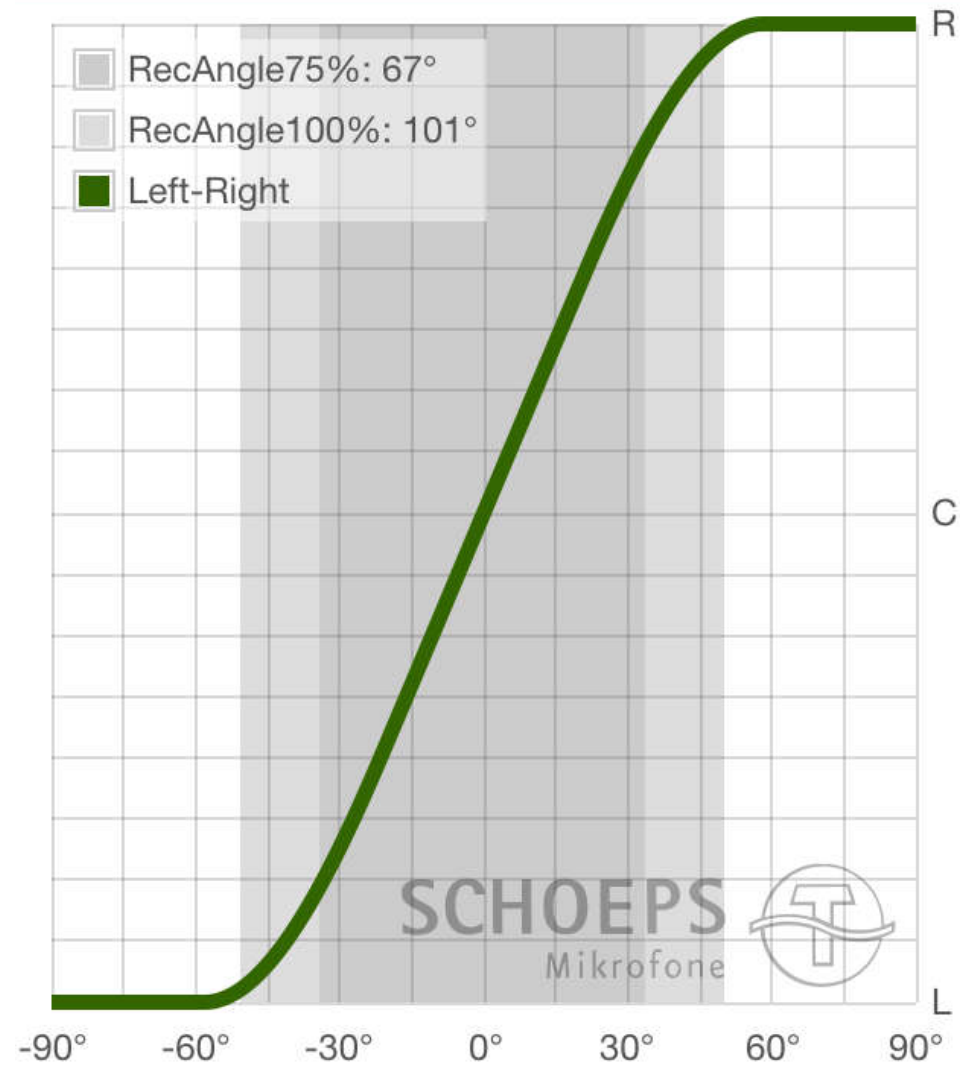
Recording Angle



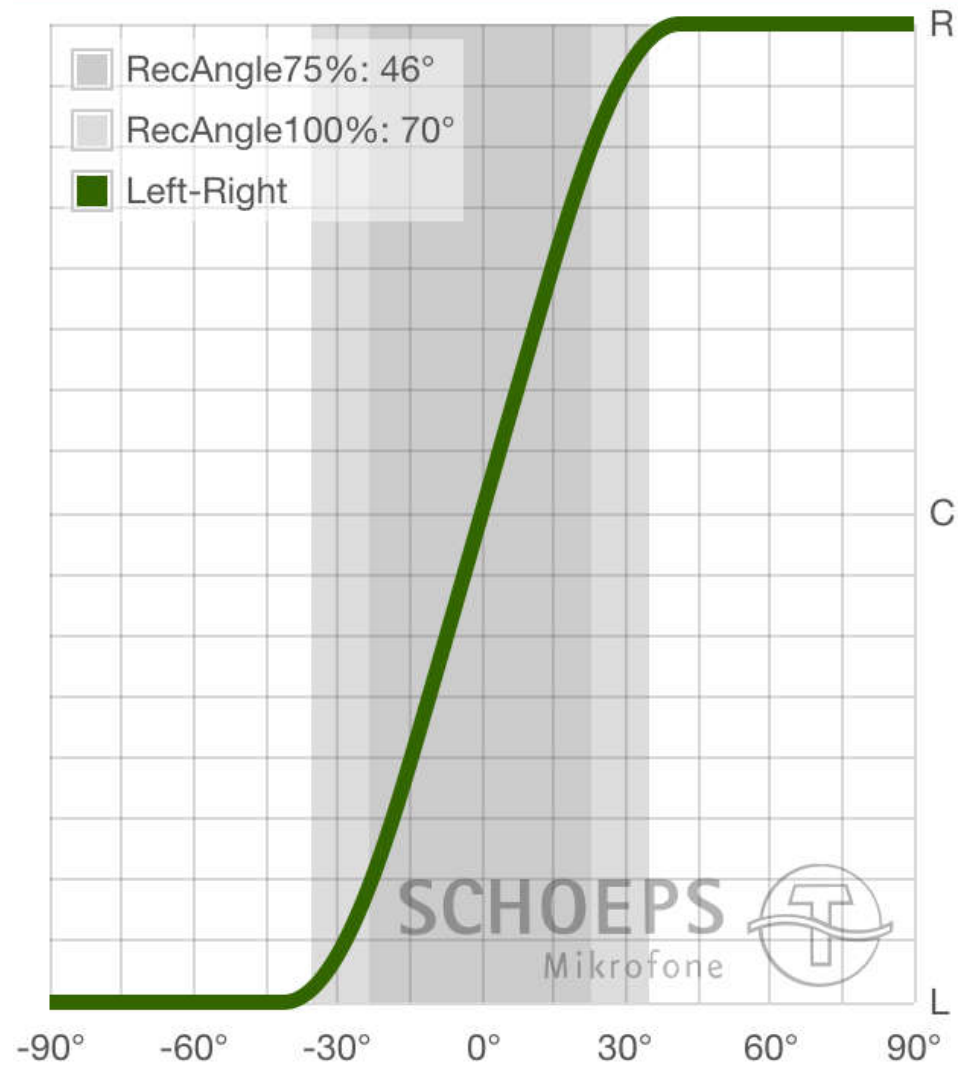
Localisation curve



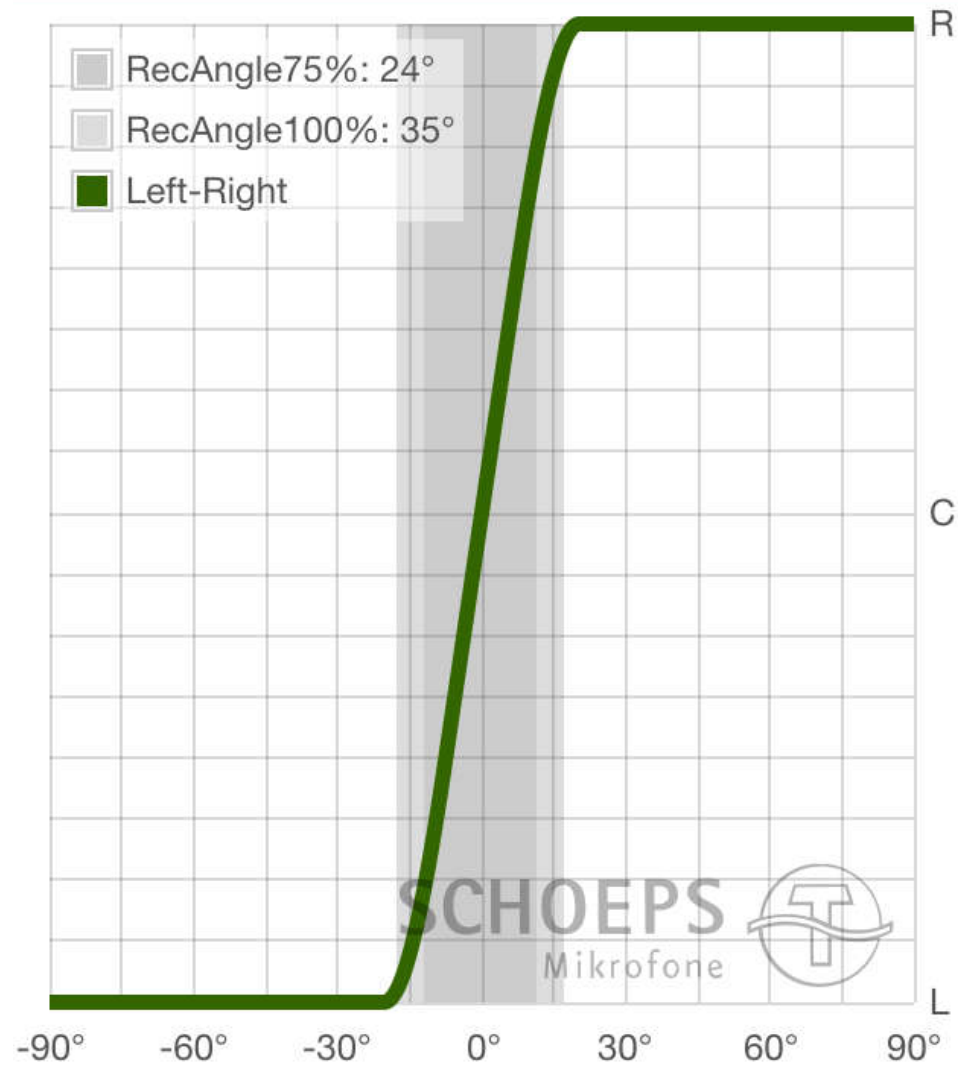
Localisation curve



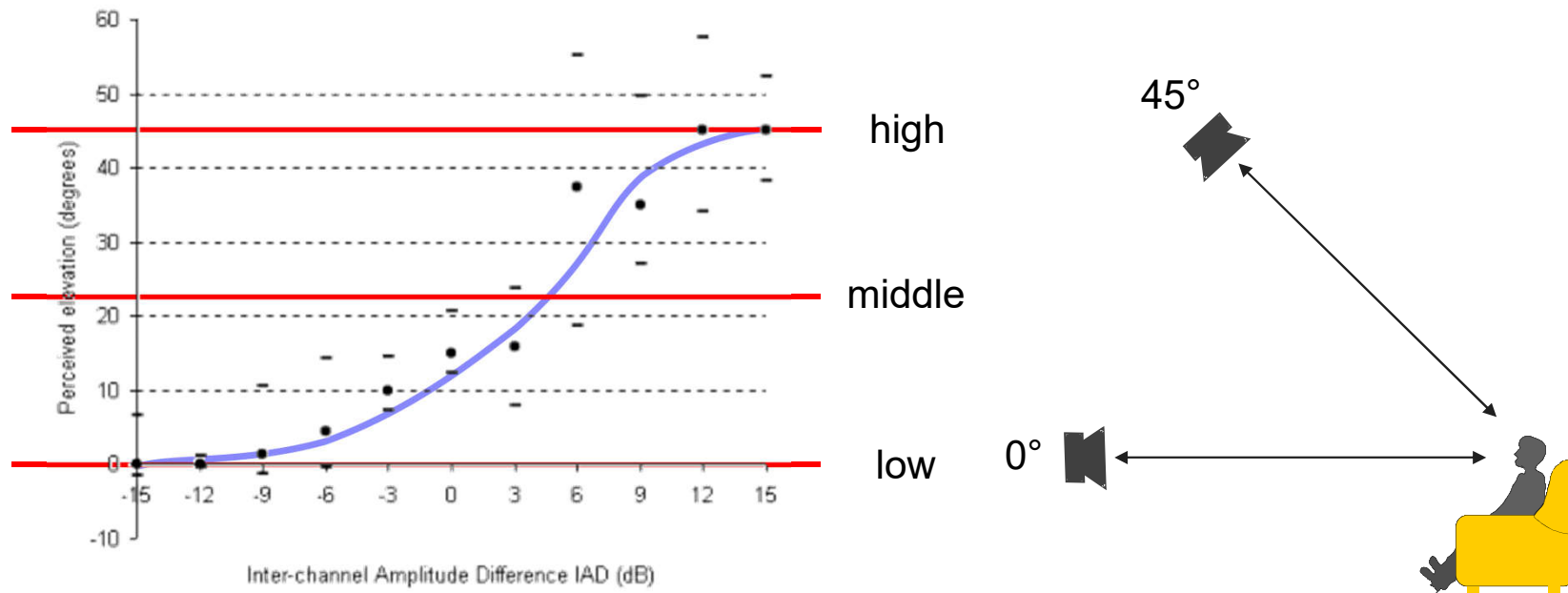
Localisation curve



Localisation curve



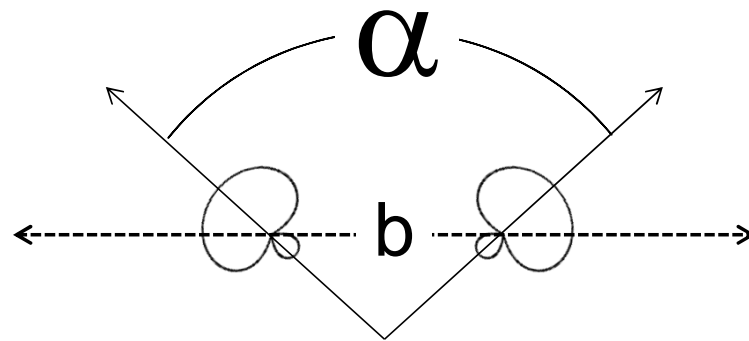
Localisation in the vertical domain



REF: Jim Barbour, AES

Diffuse field correlation

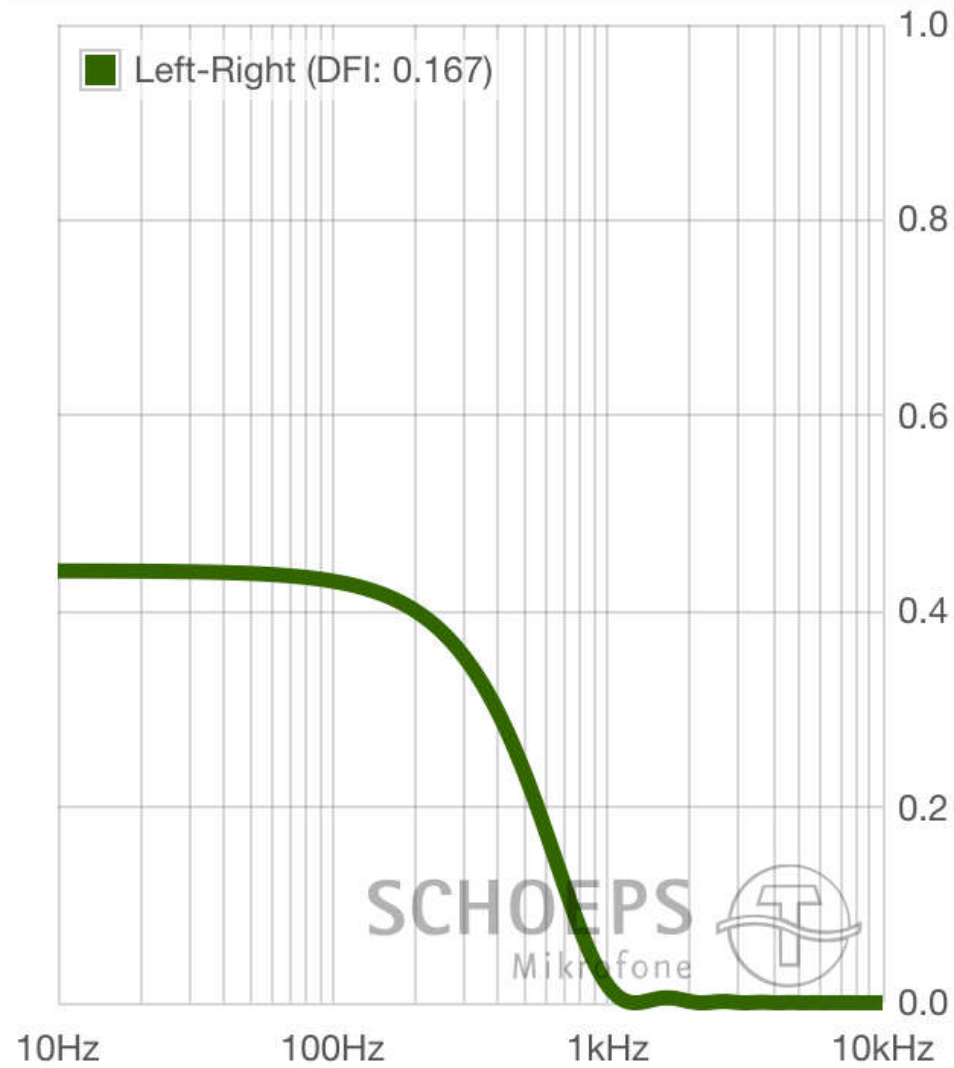
DFC (α, β, λ)



Diffuse field correlation



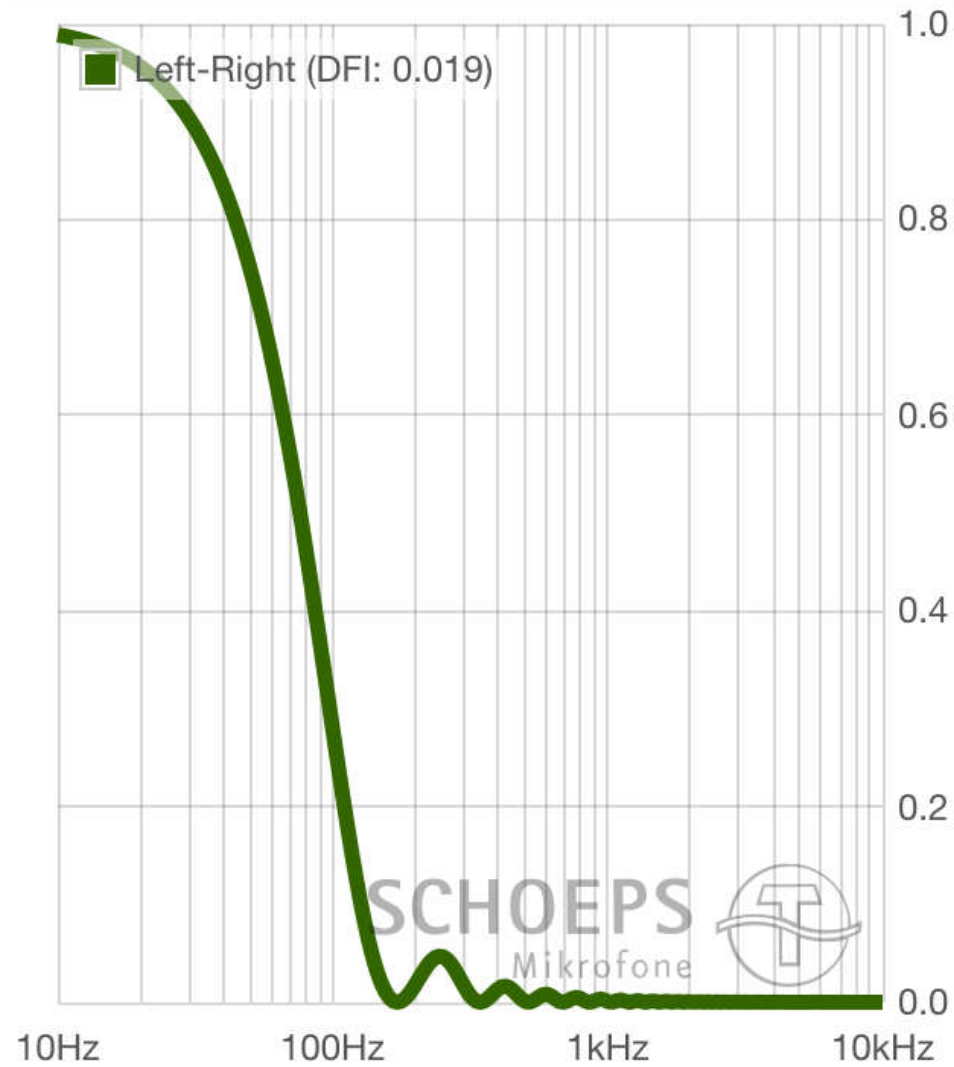
Diffuse field correlation



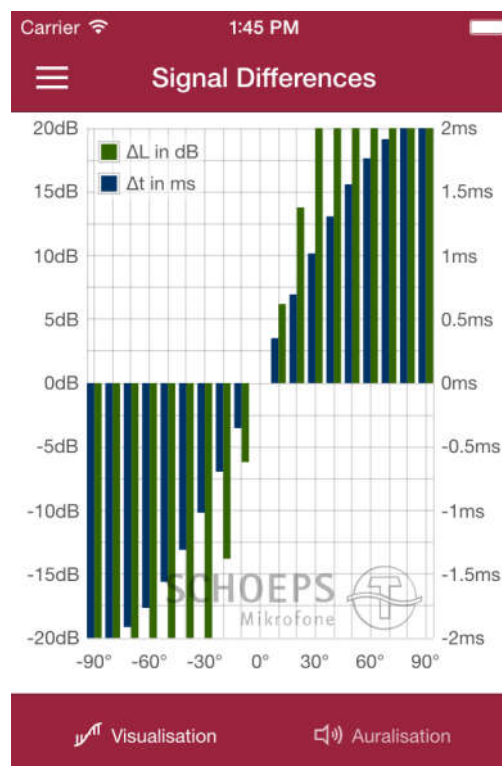
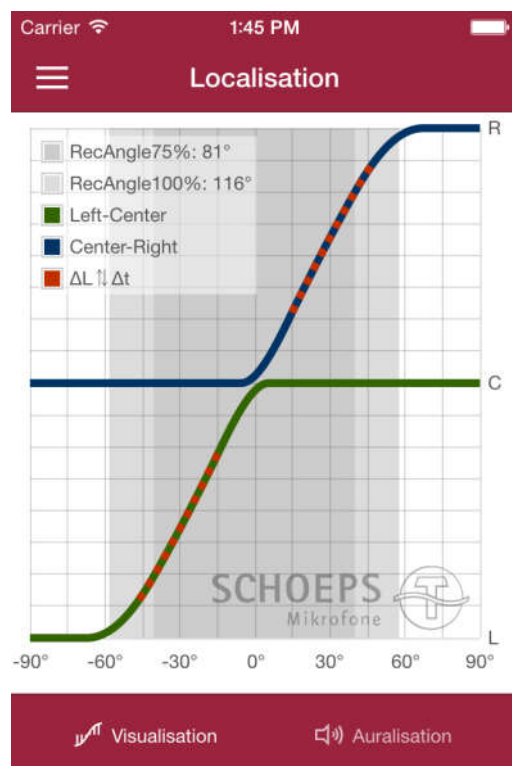
Diffuse field correlation



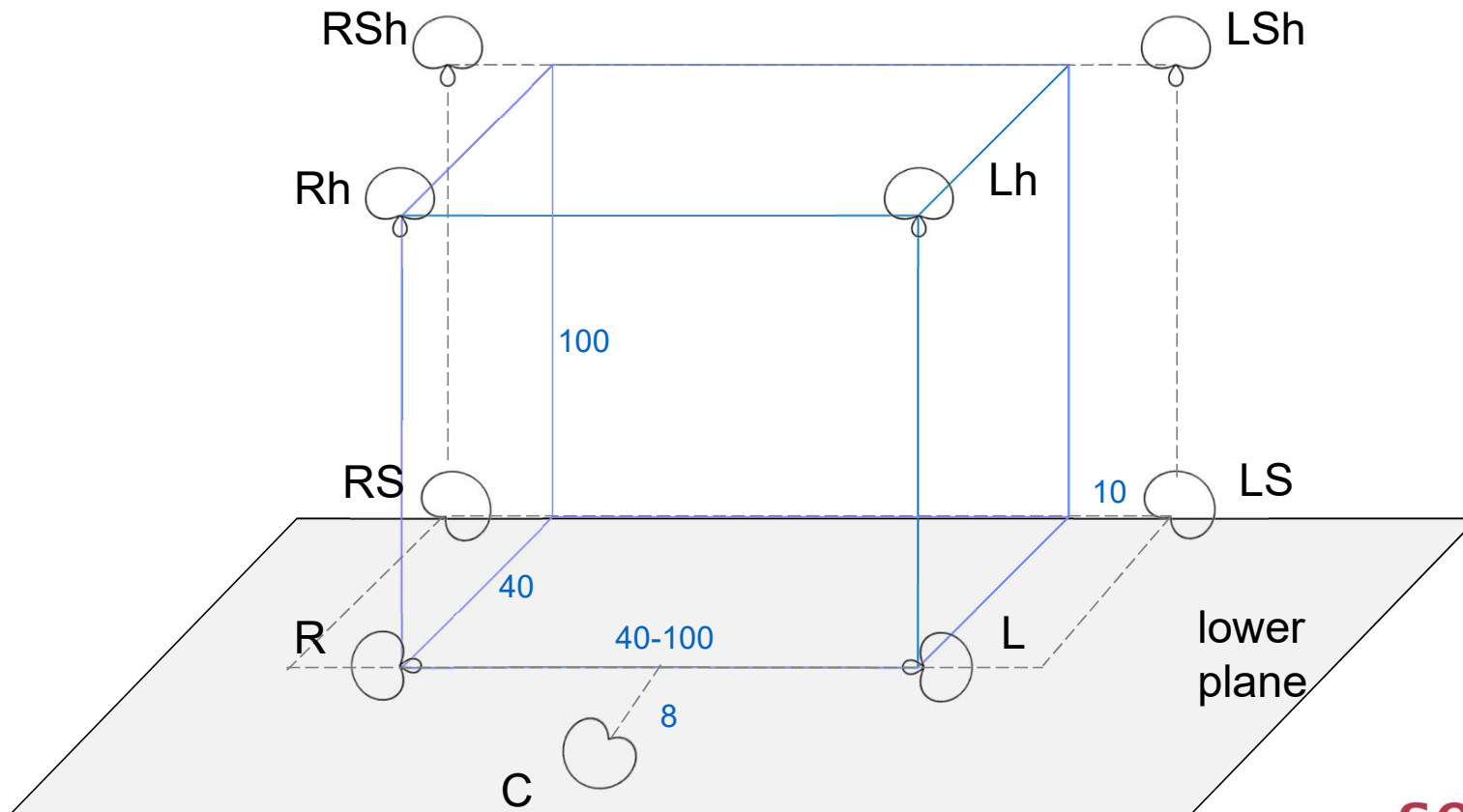
Diffuse field correlation



SCHOEPS-App “Image Assistant”: www.ima.schoeps.de and in the iOS app store

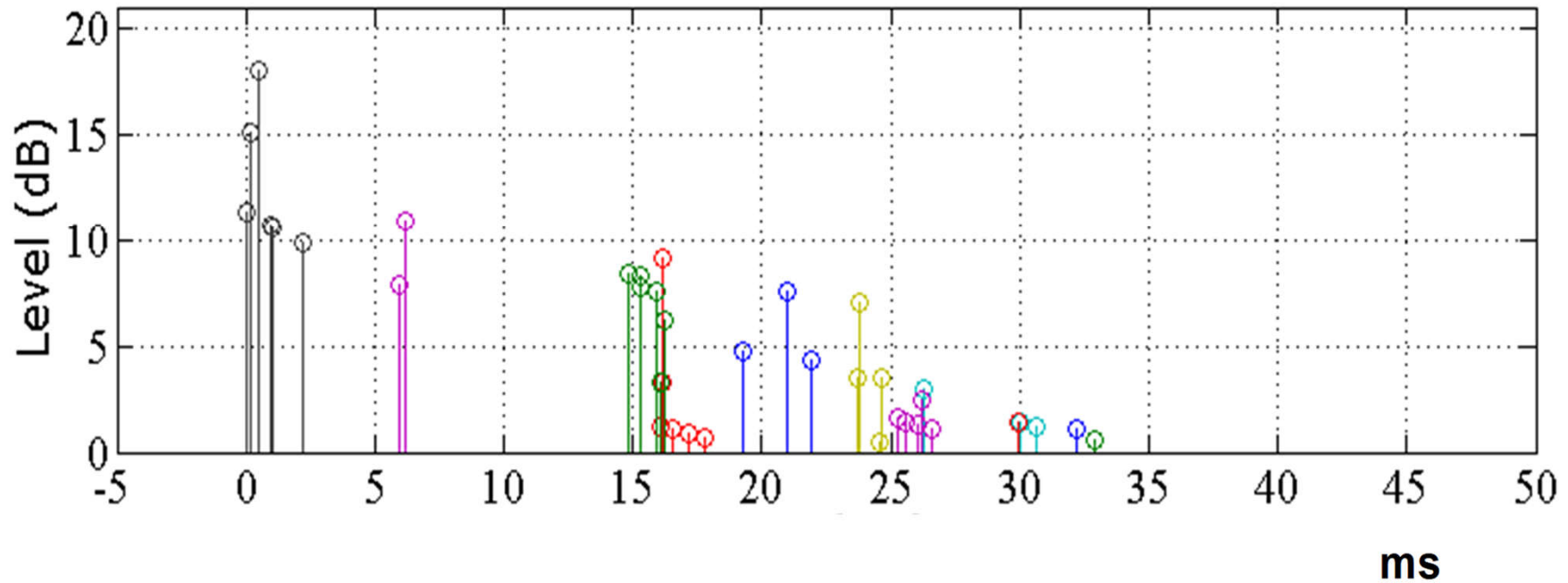


„OCT-3D“ for 3D-Stereo (9.1, 5.1.4, 22.2)
= OCT Surround + 4 Supercardioids for the height plane

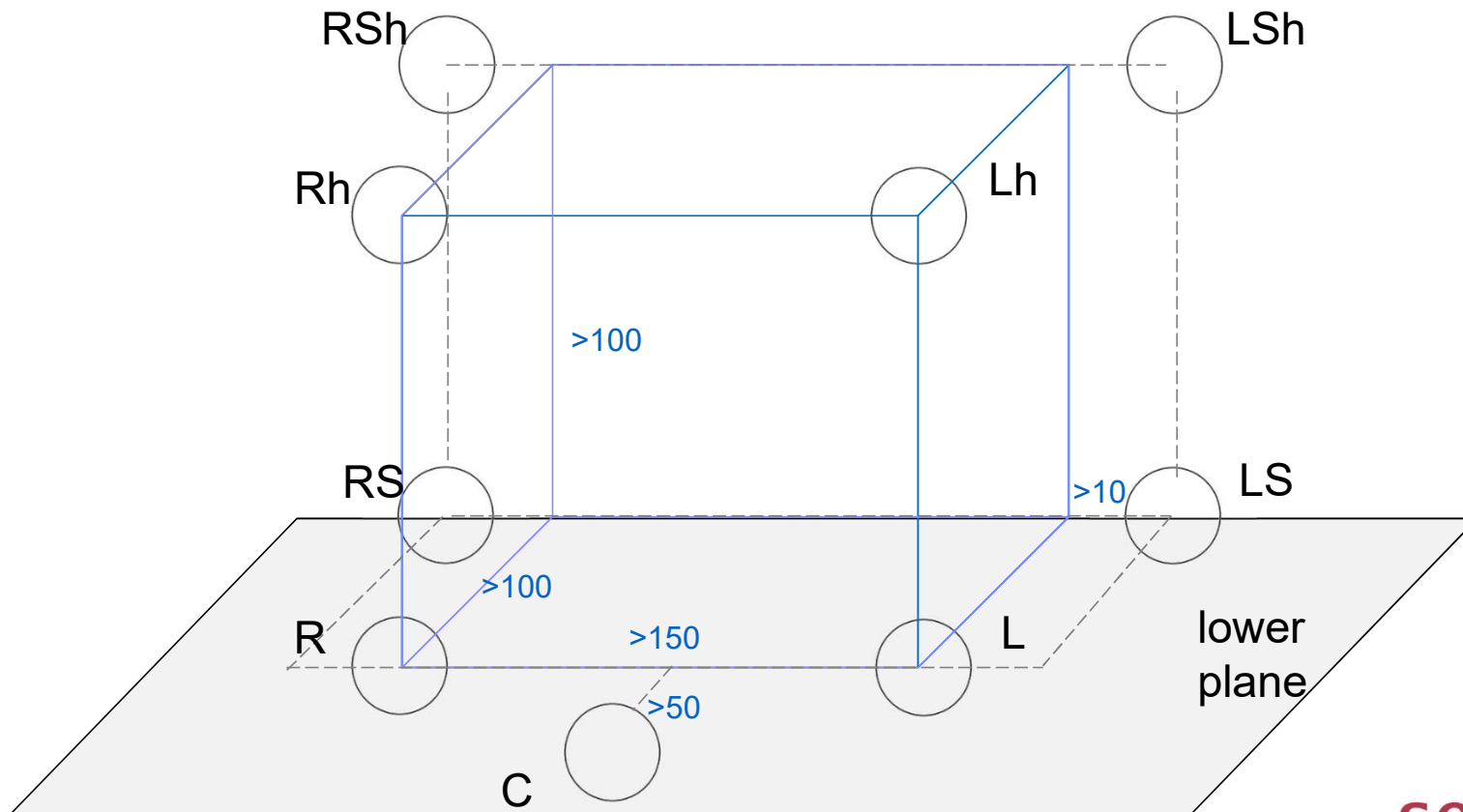


Response of a mic array (direct sound + early reflections)

OCT 70 + 4 super-cardioids pointing upwards

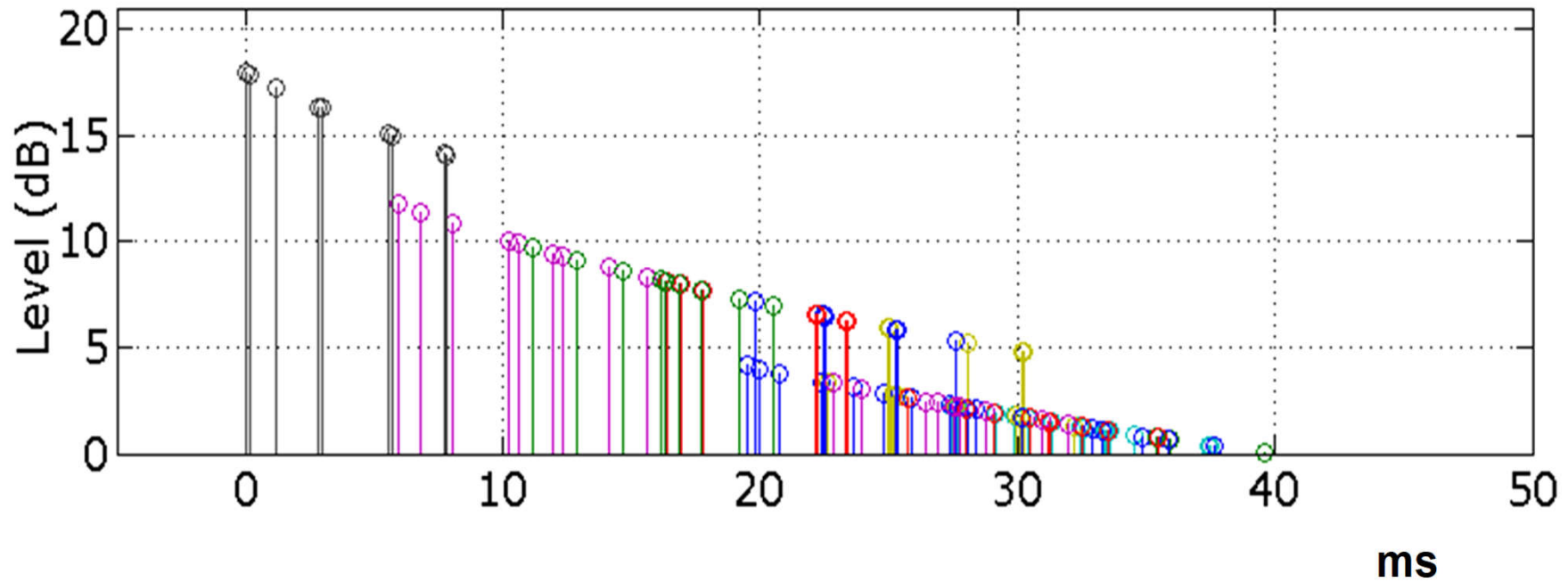


„Omni Array“ for 3D-Stereo (9.1, 5.1.4, 22.2) = 9 omnis with large spacings



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

Largely-spaced 9-channel A/B setup



Test recordings @ Galaxy Studios, Belgium

- OCT-9
- Omni array





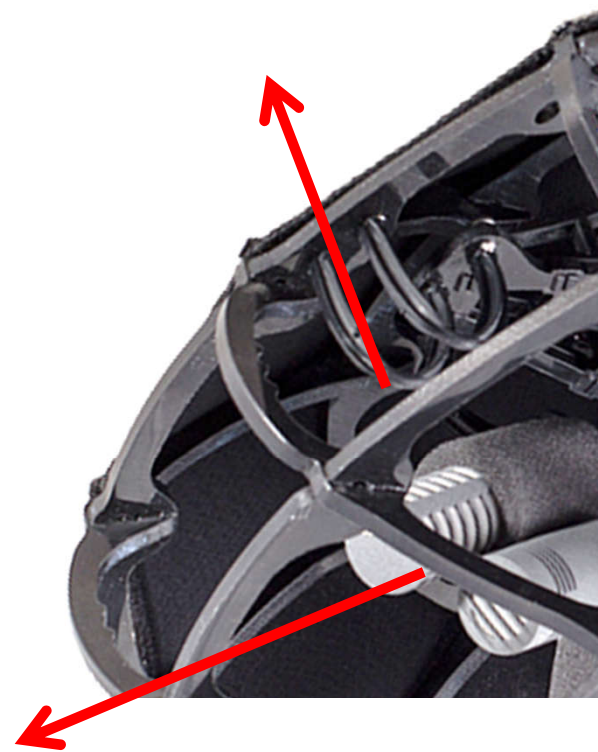
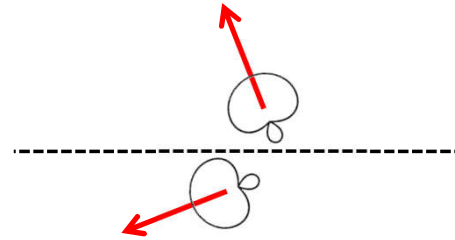
ORTF-3D „symmetrical“

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



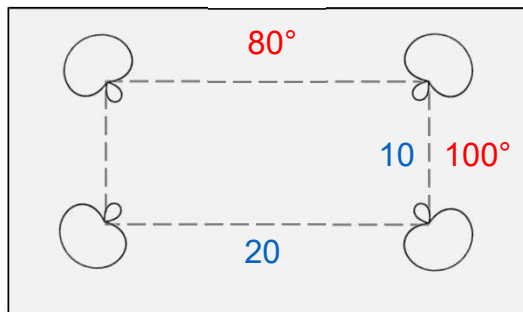
ORTF-3D

- 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

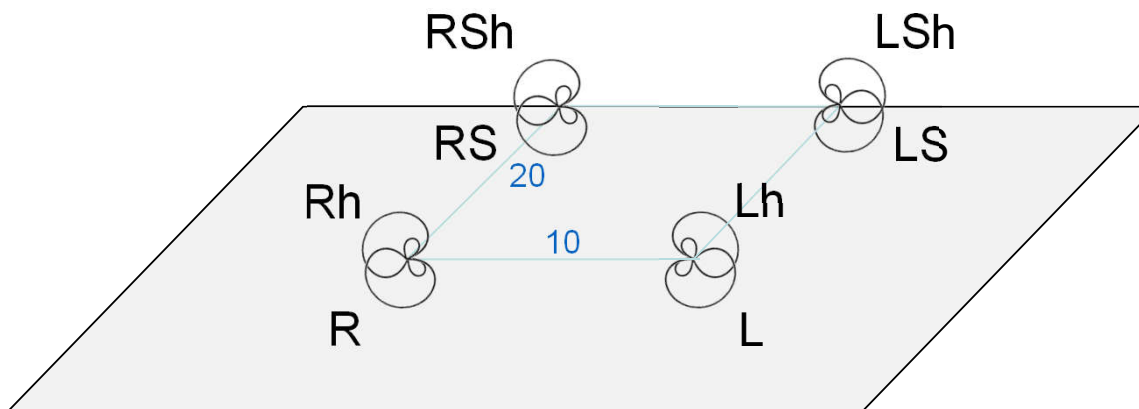
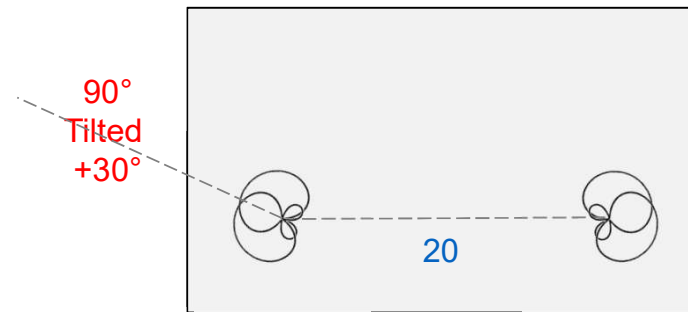


„ORTF-3D“

View from above



Side View

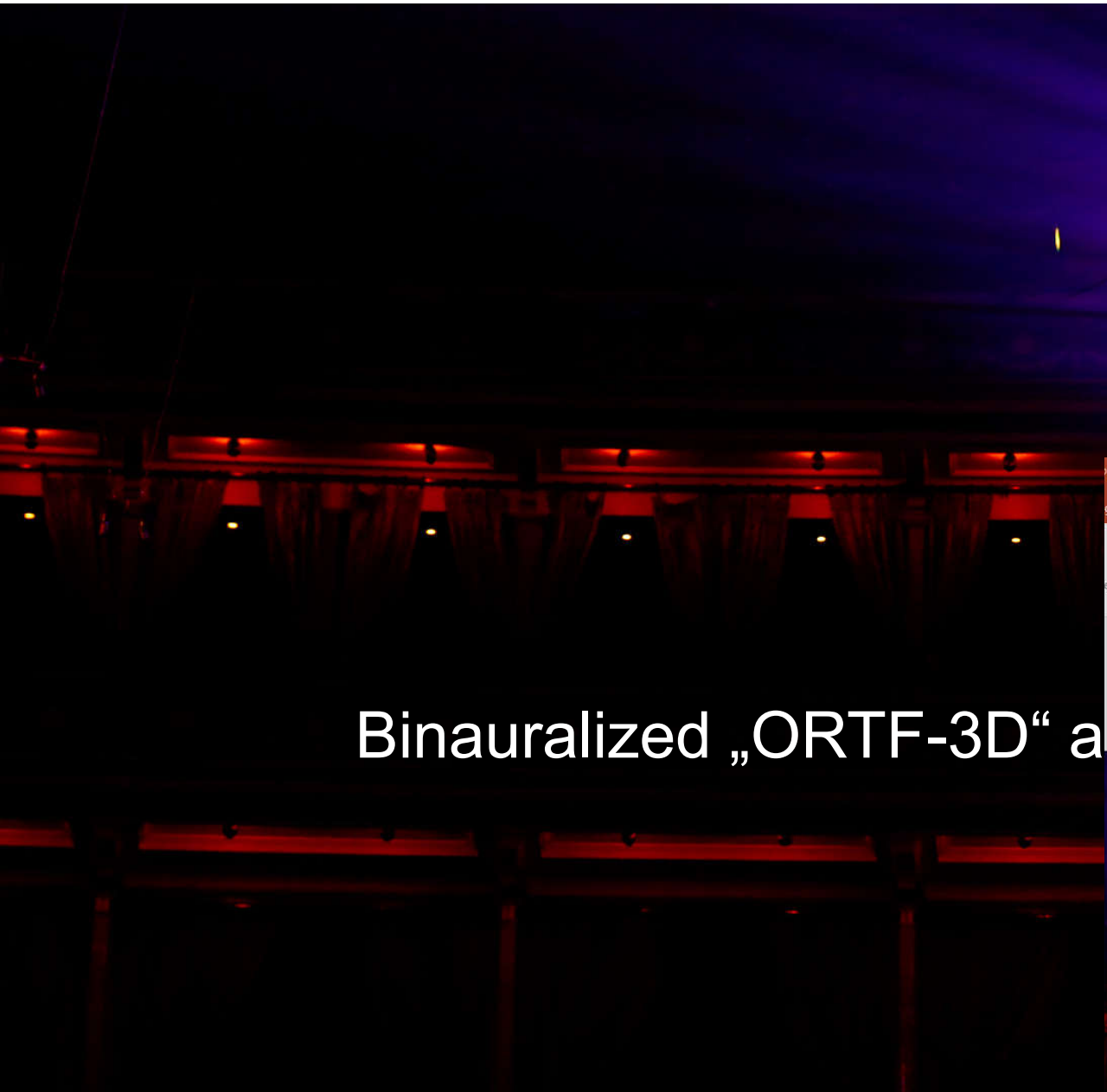


„ORTF-3D“ @ Radio France



A photograph of a concert hall interior. The scene is dimly lit, with a prominent purple light source on the right side of the frame, casting a strong glow. A binaural microphone rig, consisting of two microphones mounted on a small platform, is suspended from the ceiling by thin wires. The rig is positioned in the upper right quadrant of the image. Below the rig, the ceiling structure is visible, featuring a series of horizontal beams and recessed lighting fixtures. The lower portion of the image shows the dark, draped curtains of the concert hall's balconies or seating areas. The overall atmosphere is that of a professional recording session in a grand, historic venue.

Binauralized „ORTF-3D“ at the BBC Proms



Binauralized „ORTF-3D“ a

The screenshot shows a web browser window with the following elements:

- Browser tabs: "Binaural Audio at the BB...", "Penny Arcade - PATV - ...", "Reimut".
- Address bar: "www.bbc.co.uk/rd/blog/2016/09/binaural-pr".
- Navigation menu: "BBC", "News", "Sport", "Weather", "Shop", "Earth", "More", "Search".
- Page title: "Research & Development".
- Navigation links: "Home", "About", "Projects", "Publications", "Blog", "Contact Us", "Careers".
- Article title: "Binaural Audio at the BBC Proms".
- Text: "Posted by Tom Parnell on 2 Sep 2016, last updated 5 Sep 2016".
- Text: "BBC R&D's Tom Parnell writes about setting up a 3D audio array at the Royal Albert Hall to capture the world's greatest classical music festival in binaural audio."
- Image: A photograph of the Royal Albert Hall interior, showing a large, ornate ceiling with a complex lighting rig and a stage area illuminated with blue light.

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

Microphone array

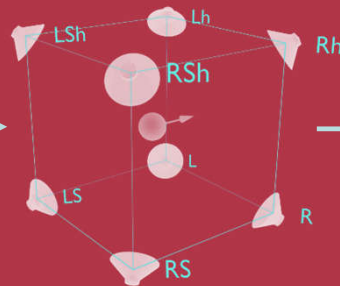
Intermediate format

Ambisonic
s
Encoder

Target format

Output

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



VS2HOA

HOA

YouTube



HOA
Bus Input

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



SCHOEPS 
Mikrofone
ORTF-3D



SCHOEPS 
Mikrofone



3D-Stereo Mic Techniques for Ambience on

www.hauptmikrofon.de

- Free download
- By Felix Andriessens



www.hauptmikrofon.de/de/ 32

3D-Audio Ambience Recording Techniques, 2016

🕒 Veröffentlicht: Montag, 09. April 2018 11:40

✍️ Geschrieben von Ton und Meister



Artikel von Felix Andriessens

Ambience recordings are a crucial tool for
designing acoustical environments and

- Youtube talks about SCHOEPS and 3D/VR:
 - <https://www.youtube.com/playlist?list=PLRqzOEeUQ2I91Gt-d7a2-wDpp6JTwWD4W>
 - https://www.youtube.com/watch?v=GgDn_Ts3aw0&list=PLRqzOEeUQ2I-aWeza-XNqArCbfKGvOGpt&index=2
 - <https://www.youtube.com/watch?v=ut9rvTsxeEY&index=5&list=PLRqzOEeUQ2I-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°“