Baltic-Nordic Acoustics Meeting 2021

BREKKE STRAND

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Live vs Recorded Symphony Experience

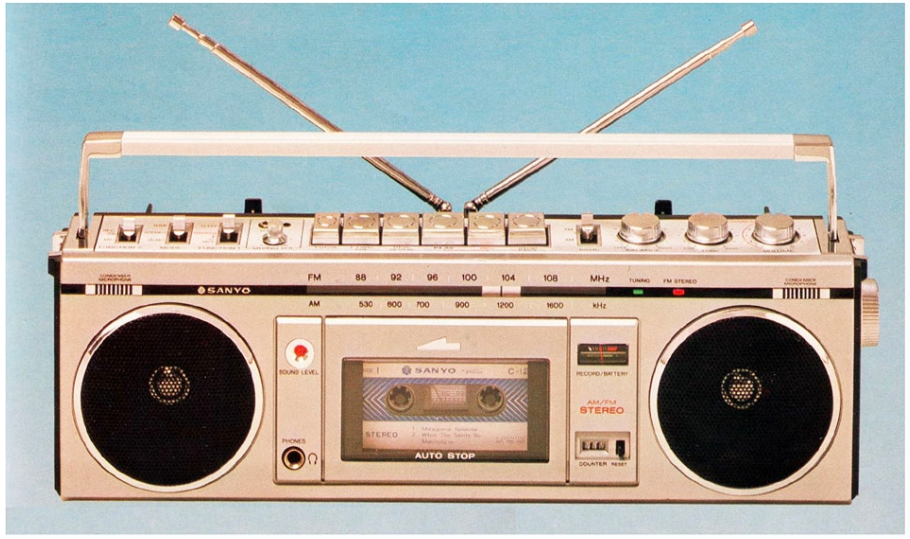
Binaural Hearing reveals the difference

Magne Skålevik
AKUTEK
Brekke & Strand

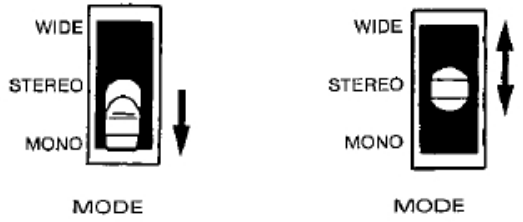
1979 my binaural revelation x3

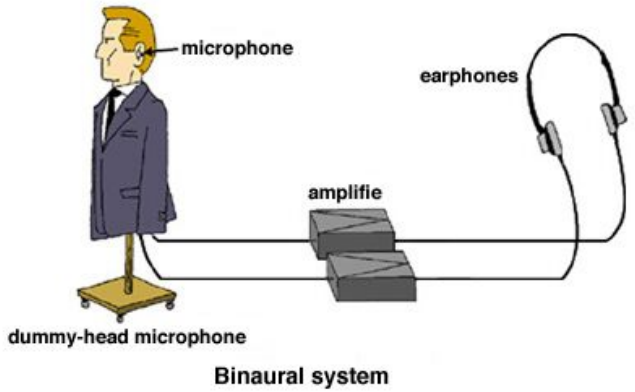
Bergen Griegsalen

Sanyo M 7700



The matrix stereo will be obtained by setting the Mode Switch to the "WIDE" position.



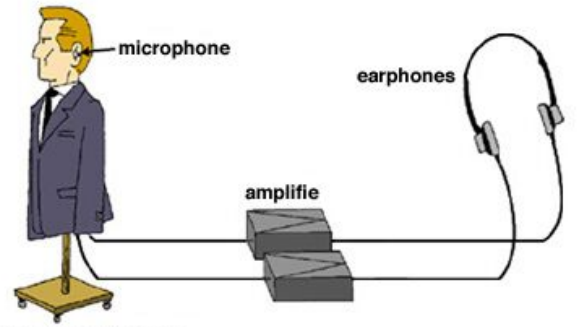


Orchestra recording

“For many people, faithful capture of an orchestral performance is the Holy Grail of recording” – Sound on Sound, May 2020

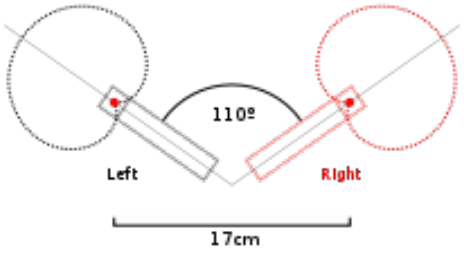
Techniques

Alan Blumlein



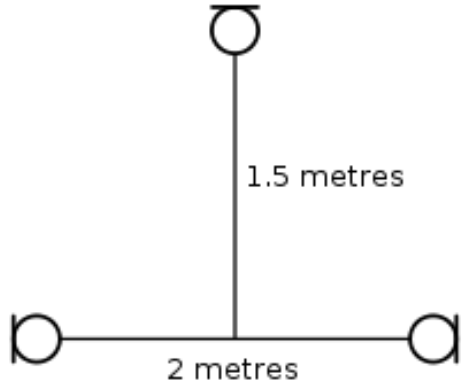
dummy-head microphone

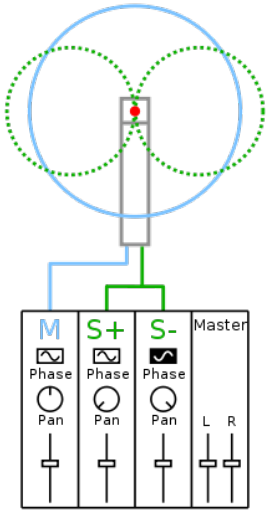
Binaural system

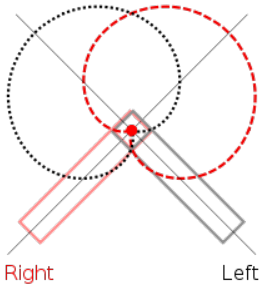


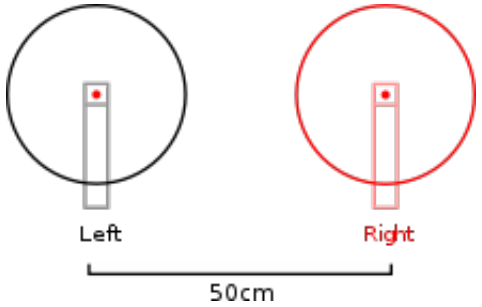
1960s ORTF

1950s Decca Tree









Mono

M-S

X-Y

A-B

1930s STEREO

Symphony orchestra – is it streamable?

Common media does not reproduce the true live binaural signal

- Binaural cues are lost in recording techniques
  - IACC, ITD, ILD, proximity, localization, broadening, envelopment
- Forced localization (with support mics) leads to a mono-patchwork
- Authentical fluctuations are missing, or just random effects

Bye-bye authentic orchestra sound image?

On the use of the **Decca Tree**, John Pellowe, sound engineer, 5x Grammy winner:

- “...the localization cues were missing, but the sound was fantastic.”

Morten Lindberg, 1 Grammy award and 28 nominations, 2014 interview:

- “Started out with the wish to reproduce reality
- “It was when we let reality go, we found the sound we were searching for

Alf Christian Hvidsteen, sound engineer, 500 records over the last 50 years:

- “A trend away from the pure two-mic stereo
- “Towards use of more close-up microphones
- => Higher IACC and direct-to-reverb ratios in the final mix of recordings

“Even if the producer, conductor and recording engineer started out with a back-to-basics approach with a stereo-pair, the demand for adjusting the balance between voices would come up in the post-processing. At that stage, to gather the ensemble for a new take is not an option in the real world.

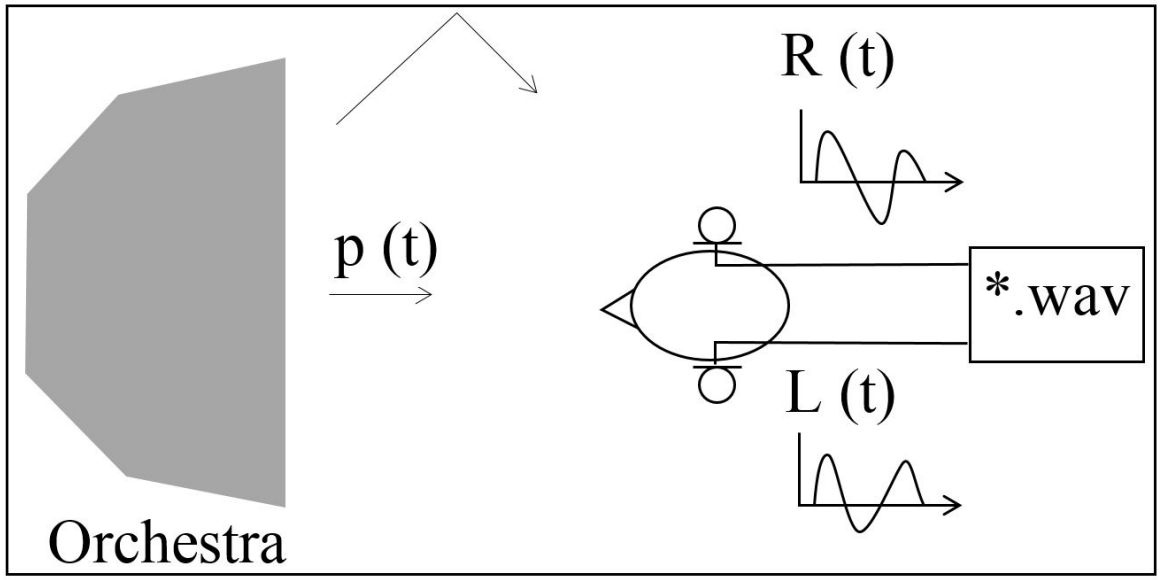
2011 the Binaural Project

- Recording binaural signal from symphony orchestra concerts
- Can listening aspects be explained by features in IACC-data?

Localization

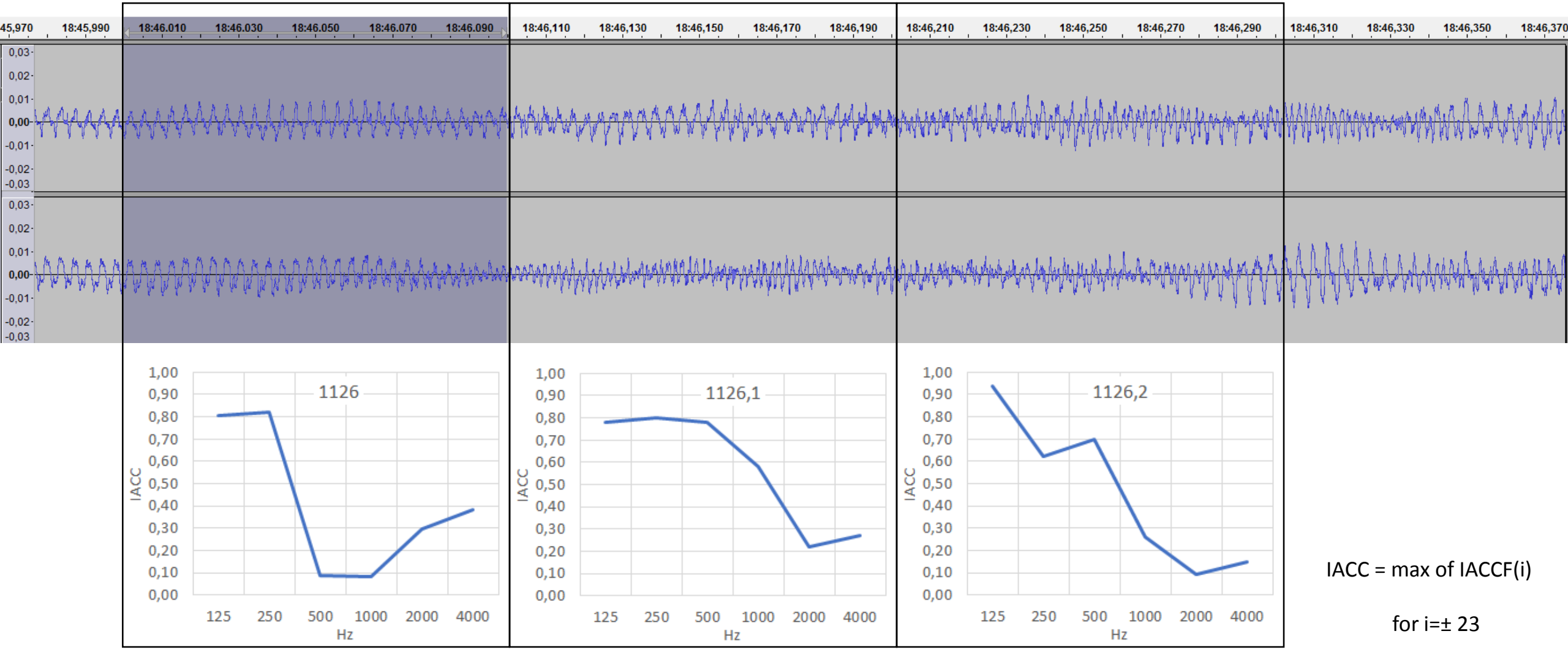
Source Broadening

Envelopment



Equipment and setup

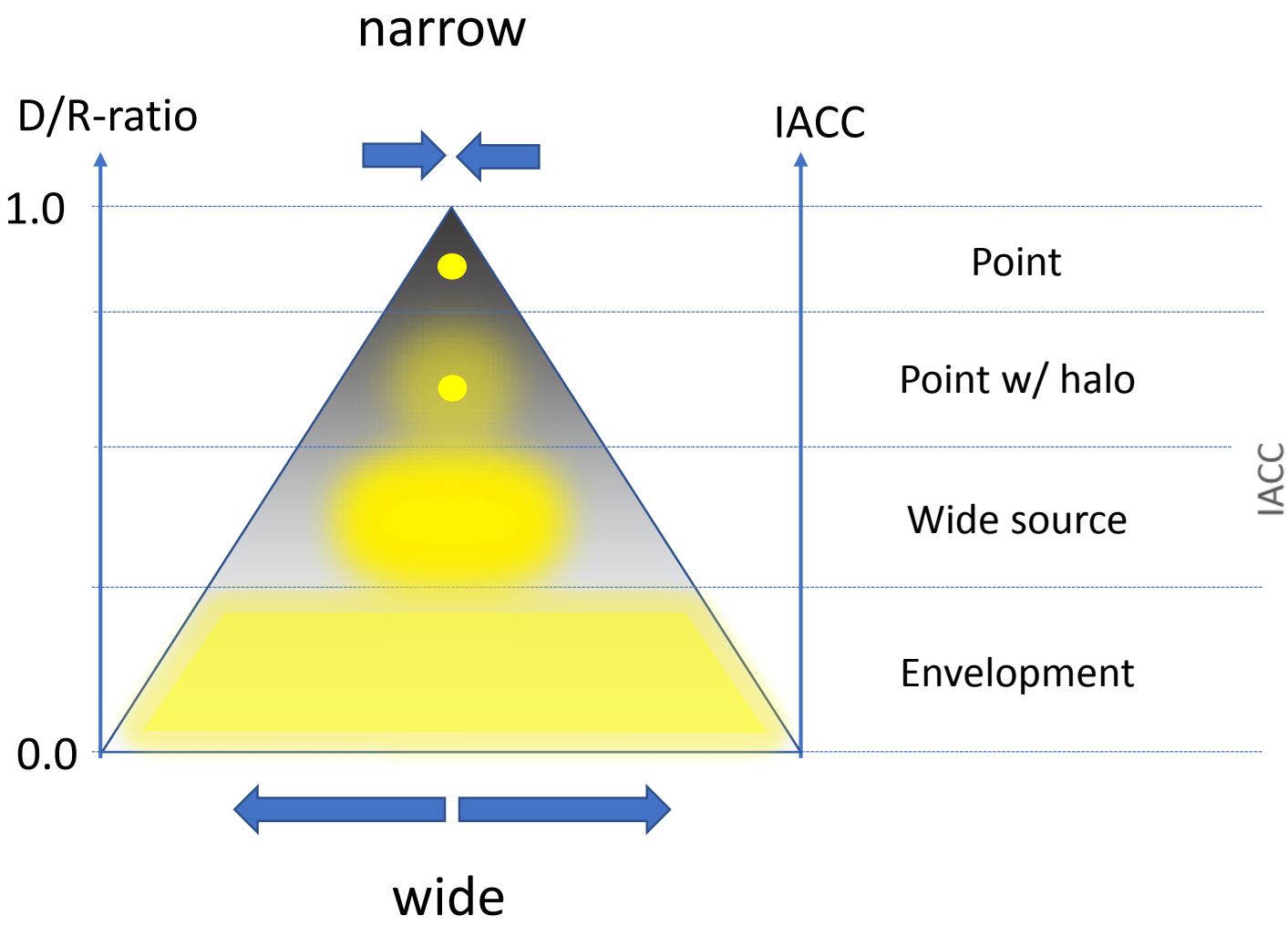
Six-octaves spectrum from each 100ms window

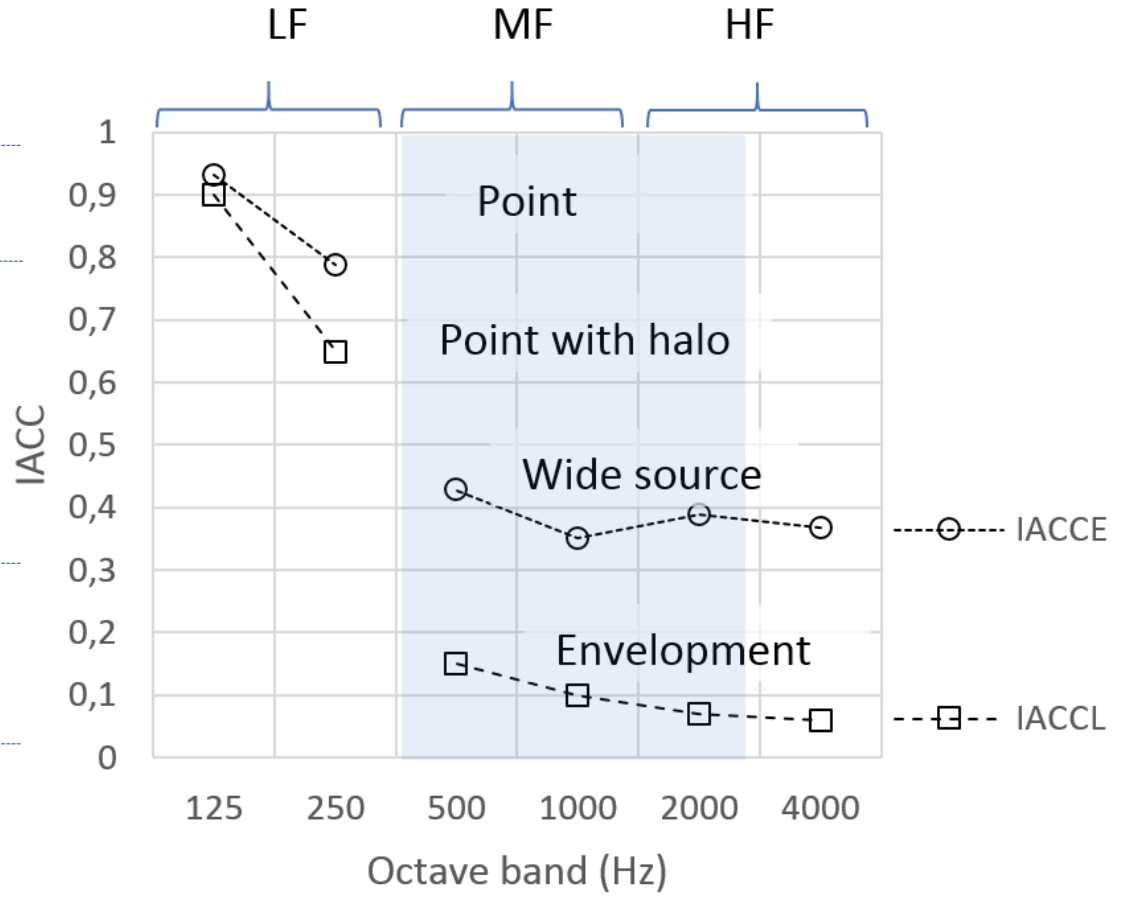


IACC = max of IACCF(i)

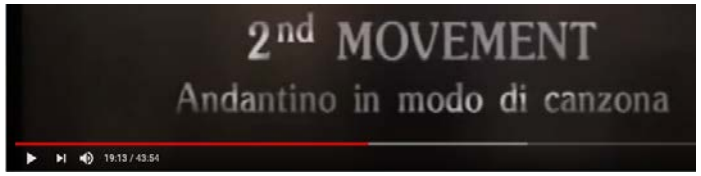
for i=± 23

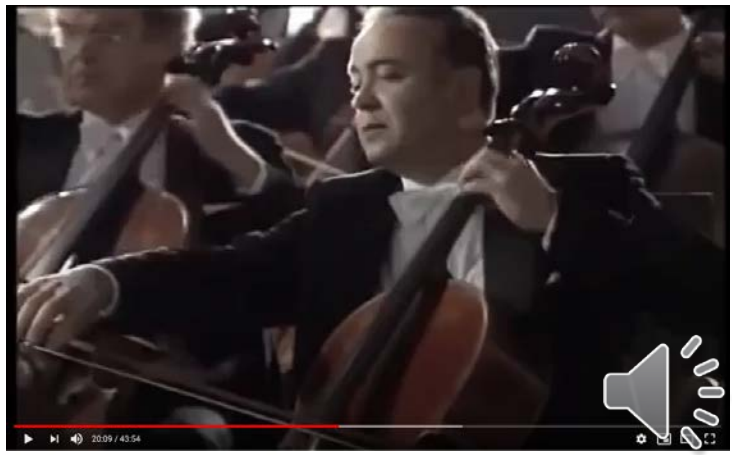
IACC and perception, octave bands

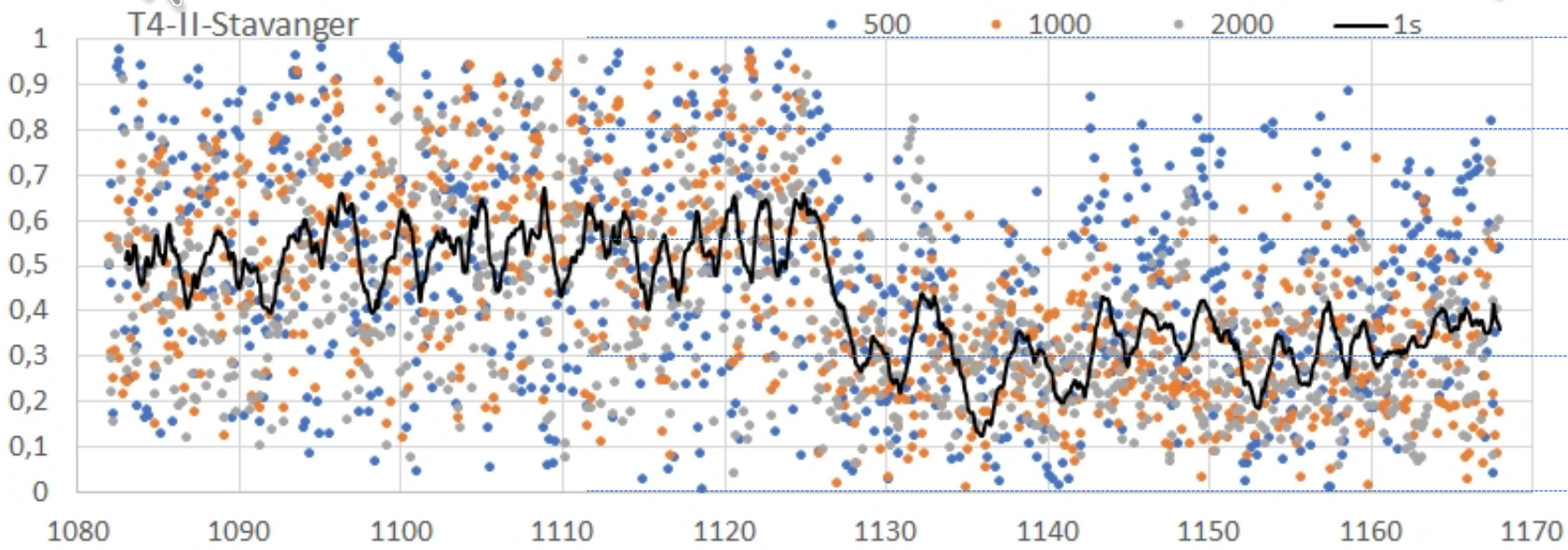




Example: IACC in Tchaikovsky 4th







Perceived sound image from cues

Point

Point w/ halo

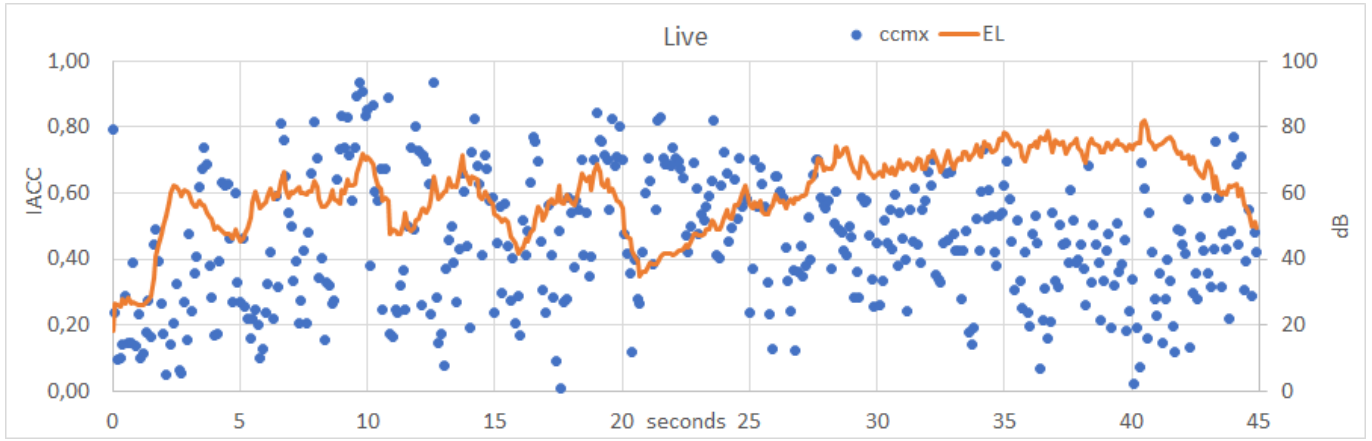
Wide source

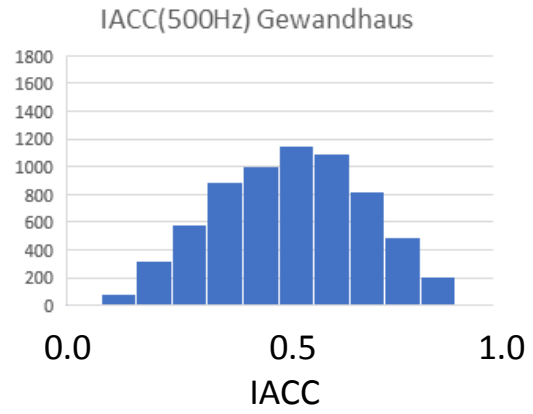
Envelopment

Decca 2012 – higher, more compressed IACC

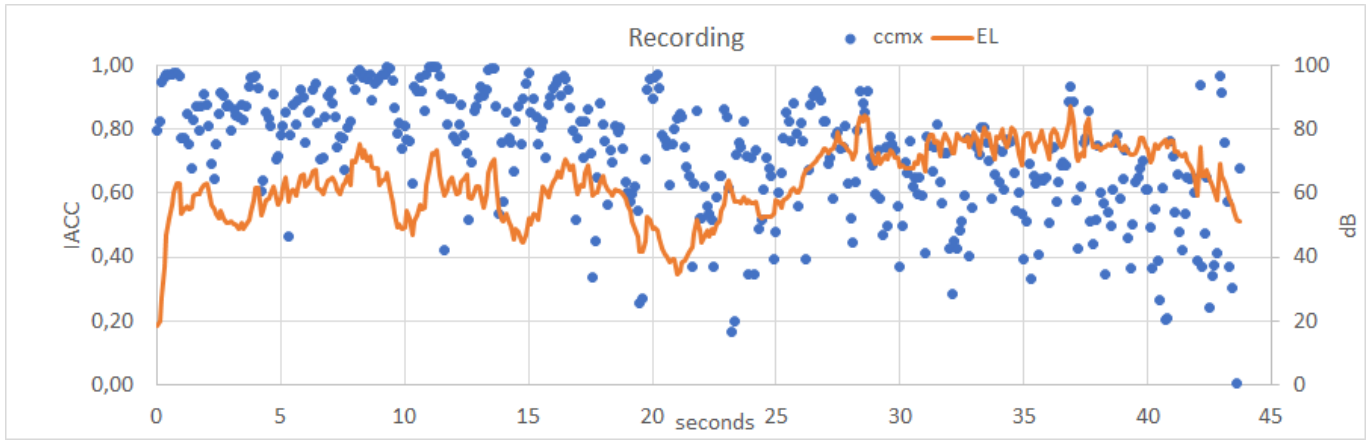
Upper: Janine Jansen w/ Gewandhaus Orchestra, **live in Gewandhaus** Leipzig

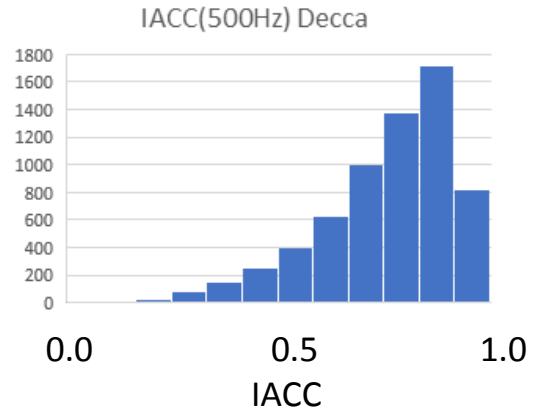
LIVE





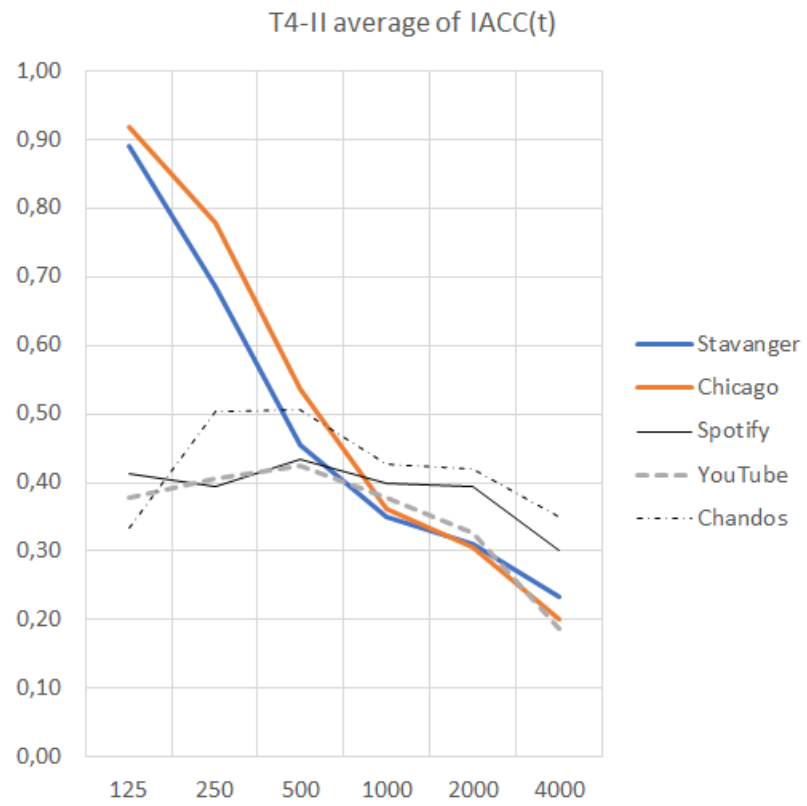
RECORDING

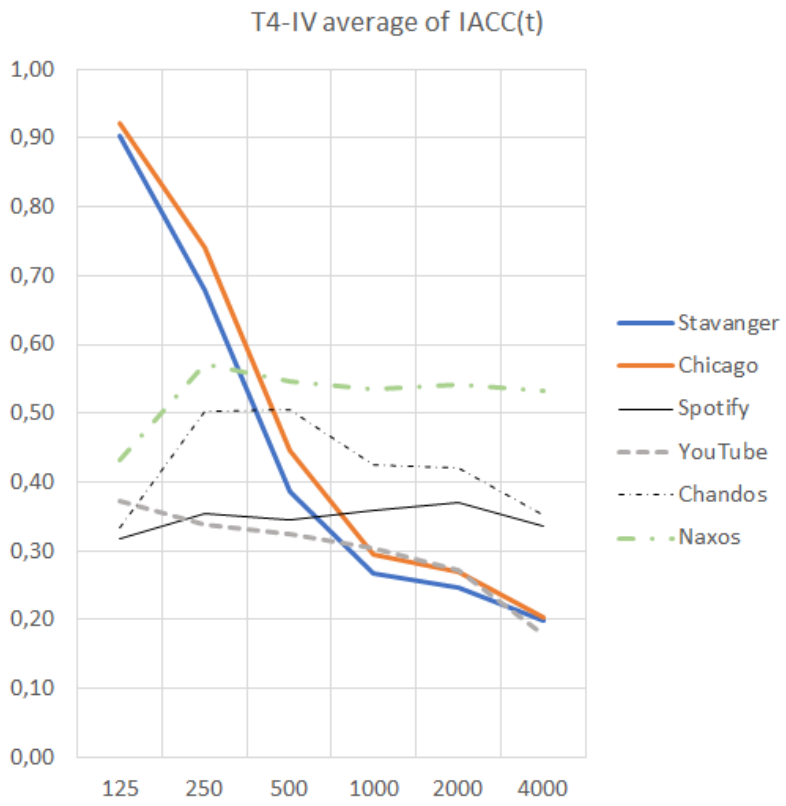


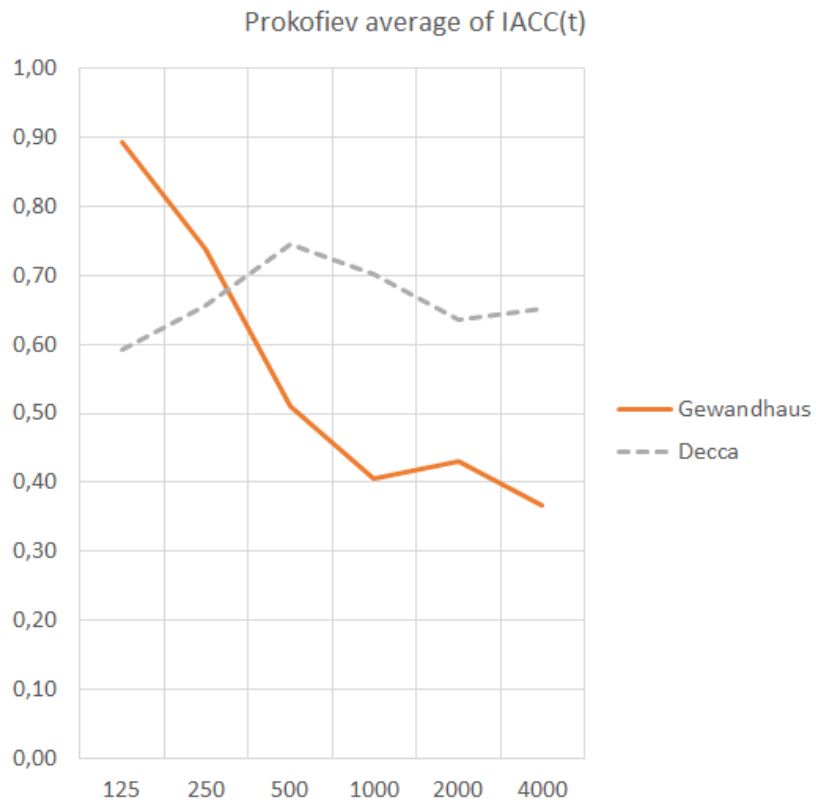


Lower: Janine Jansen w/ London Philharmonic, **Decca recording**

IACC spectrum Live vs Headphone listening







Conclusion

Newer recording techniques have less authentic sound reproduction

Orchestras stream more concerts every year – RISKY BUSINESS

Kids learn about music through headphones

Symphonic music is not a streamable experience,...

...unless they start streaming binaural recordings

Available media will not attract newer generations to the symphony hall

Baltic-Nordic Acoustics Meeting 2021

BREKKE STRAND

Thank you for listening

You want more info?

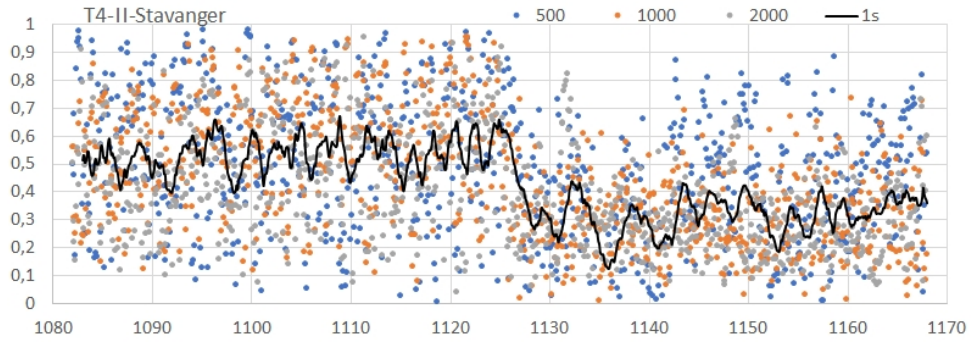
www.akutek.info

The Binaural Project page

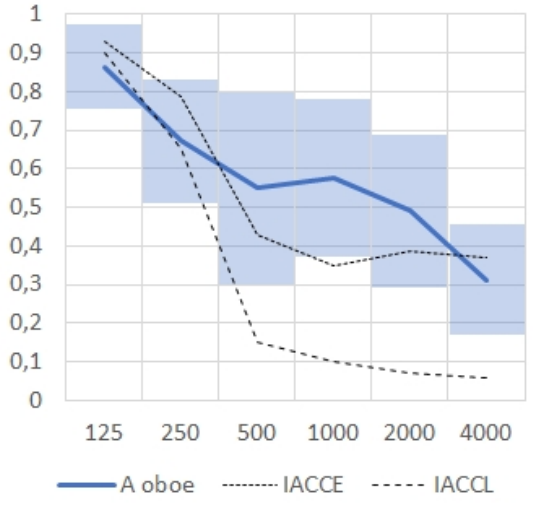
www.akutek.info/binaural_project.htm

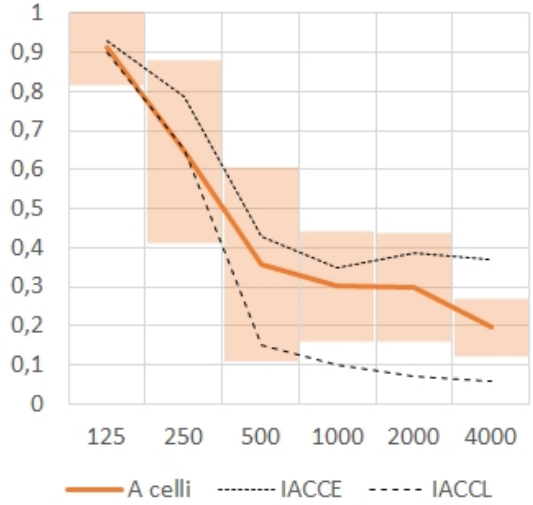
Chicago and Stavanger

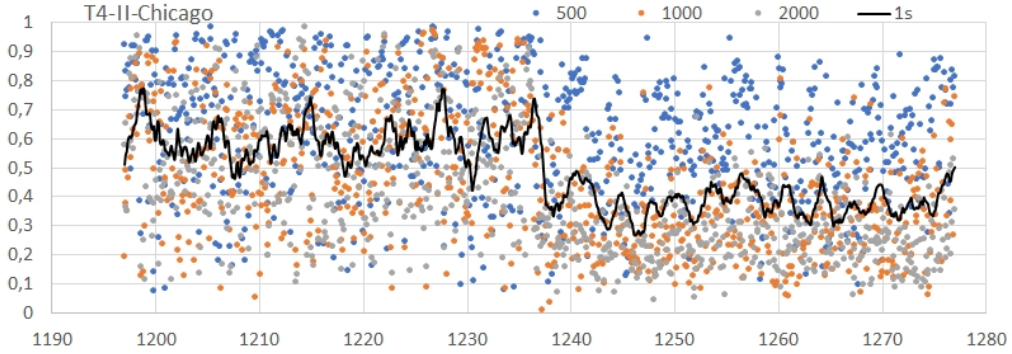
Quite similar, but Chicago higher in 500Hz
=> more Localization and less Envelopment



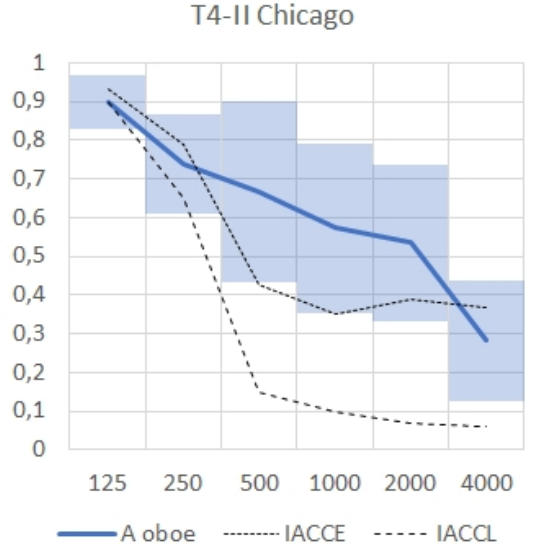
Stavanger

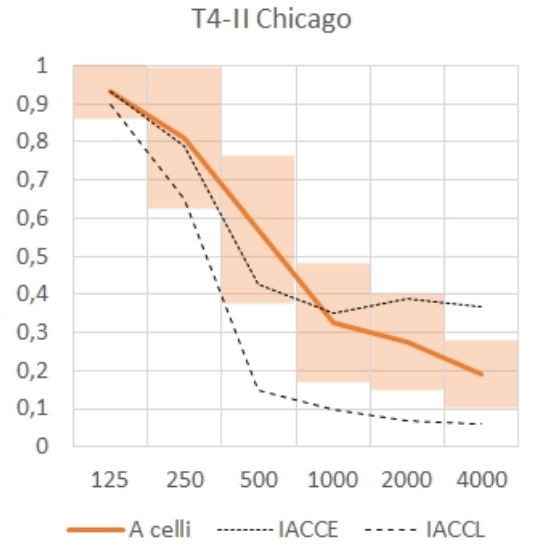






Chicago



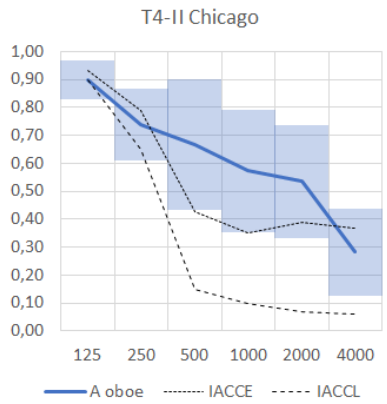


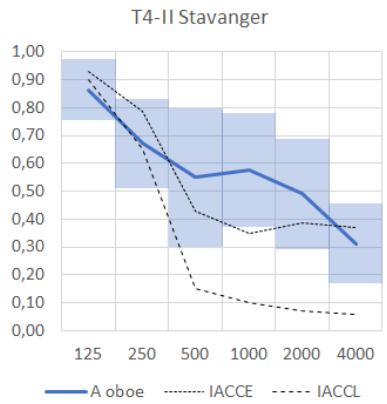
IACC spectra Live x2 and Recordings x3

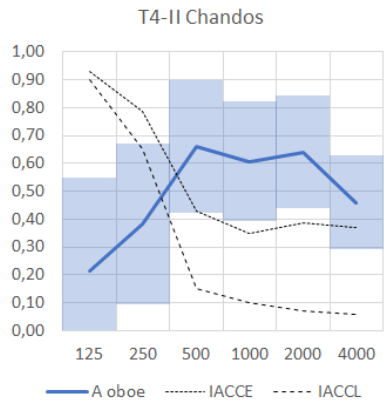
Live

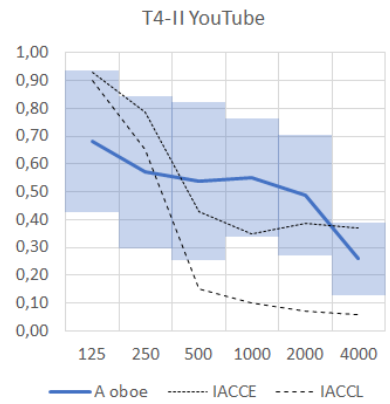
Recordings

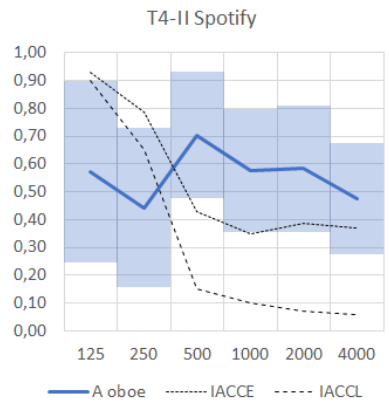
Oboe solo



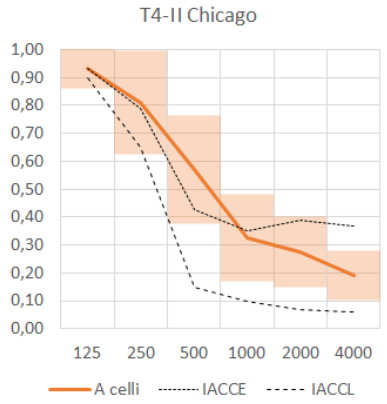


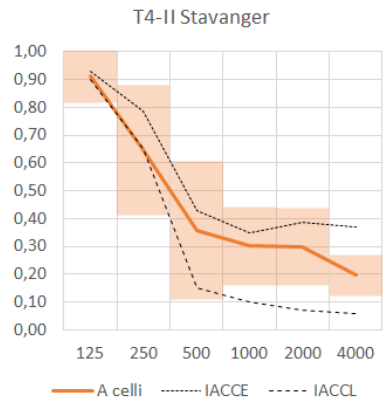


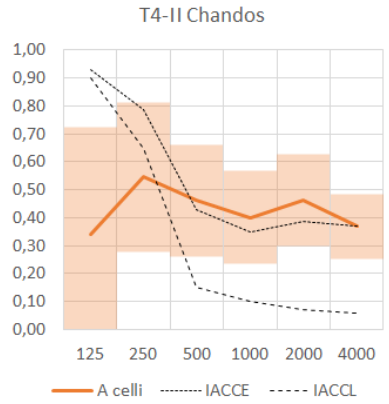


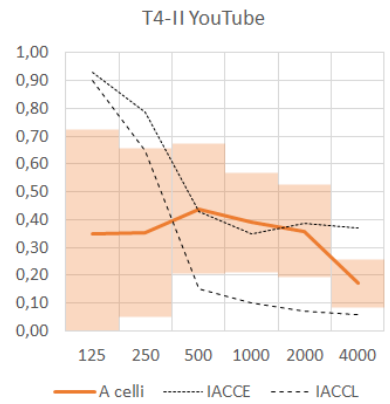


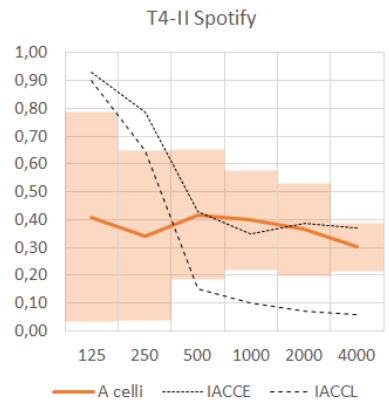
Cello section











2011 the Binaural Project

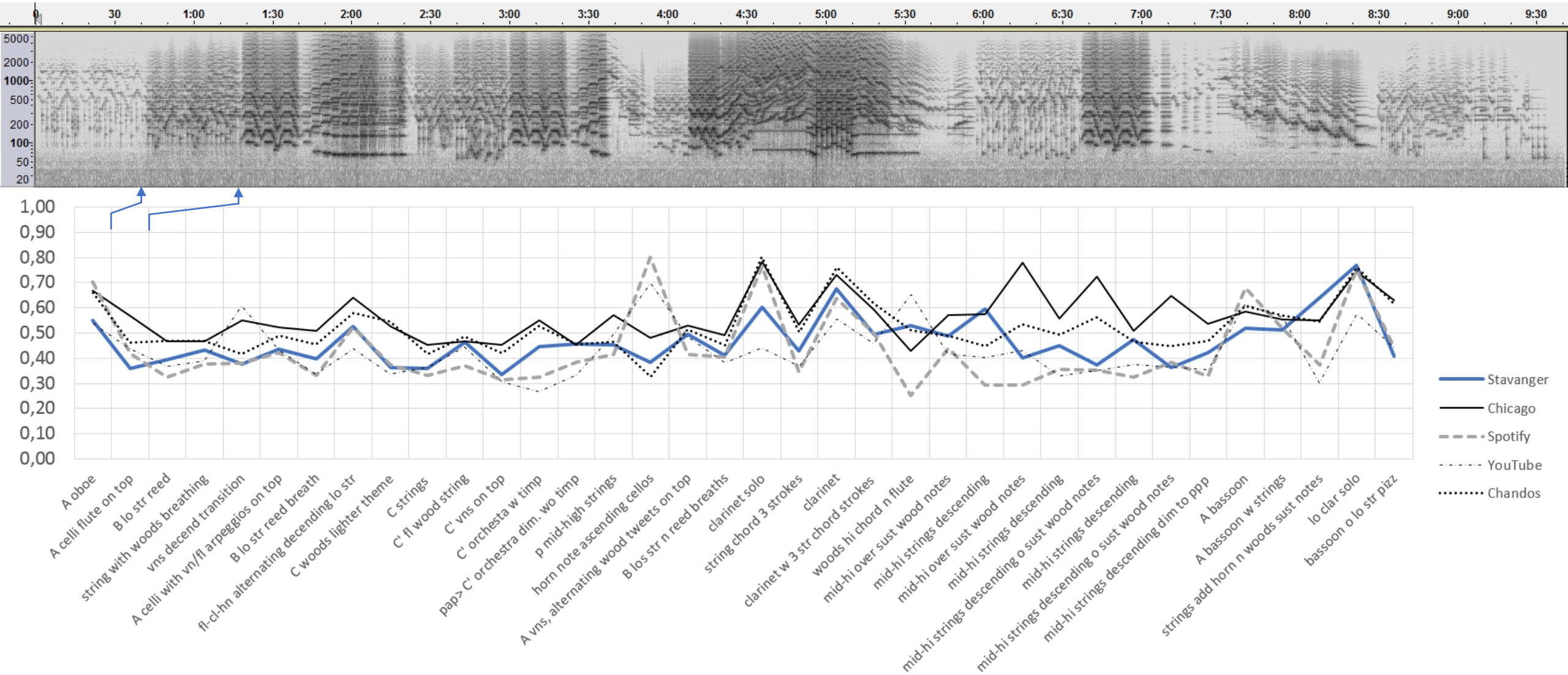
- Recording binaural signal from symphony orchestra concerts
- Can listening aspects be explained by features in IACC-data?

Localization

Source Broadening

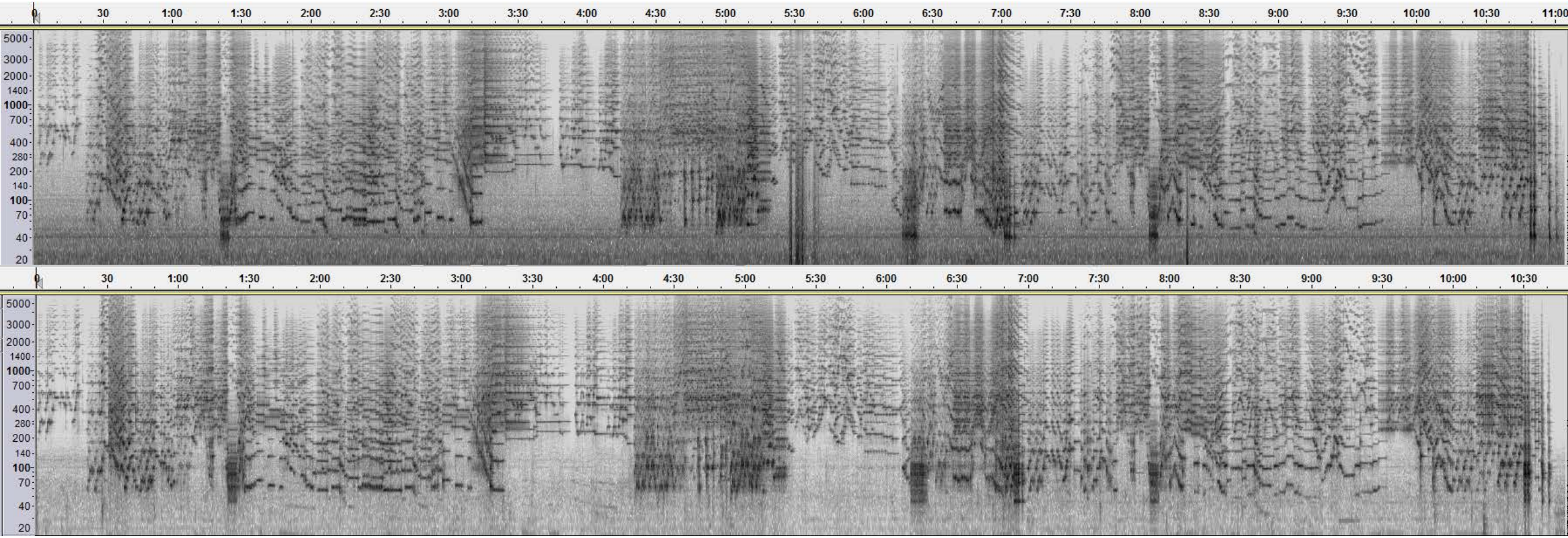
Envelopment

IACC in T4-II, 2 live and 3 recorded versions



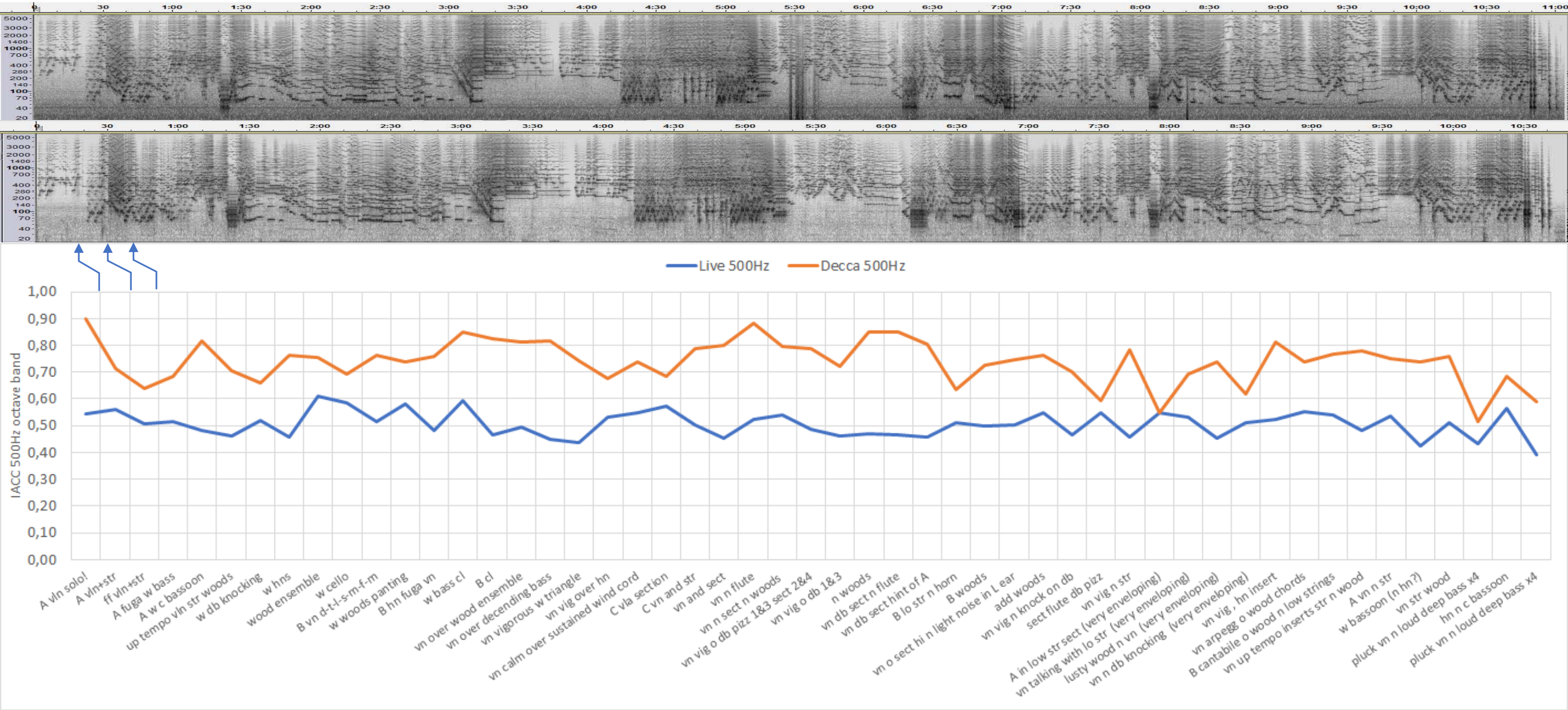
IACC Prokofiev violin concerto, Live and Recorded

Above: Janine Jansen w/ Gewandhaus Orchestra, **live in Gewandhaus** Leipzig

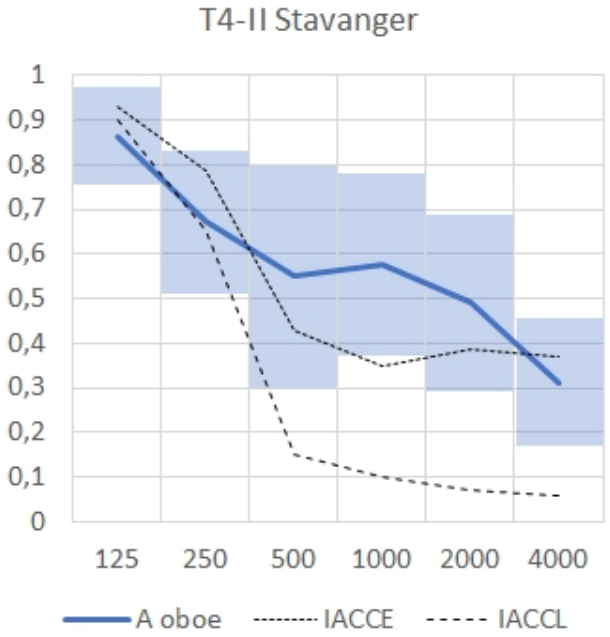


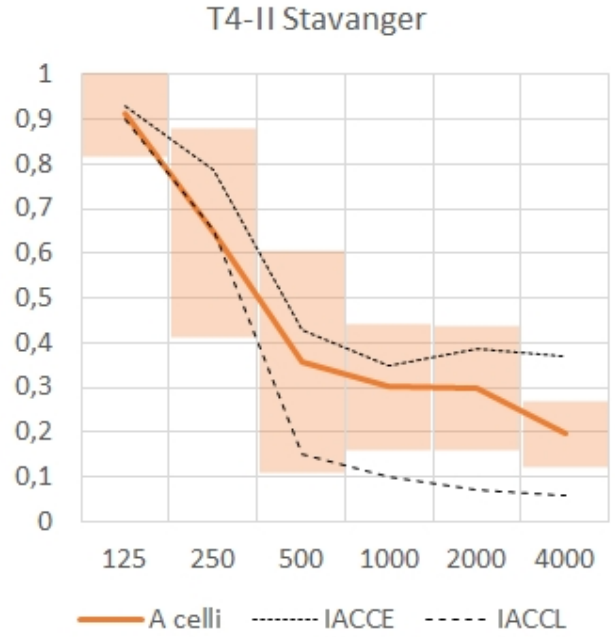
Above: Janine Jansen w/ London Philharmonic, **Decca recording**

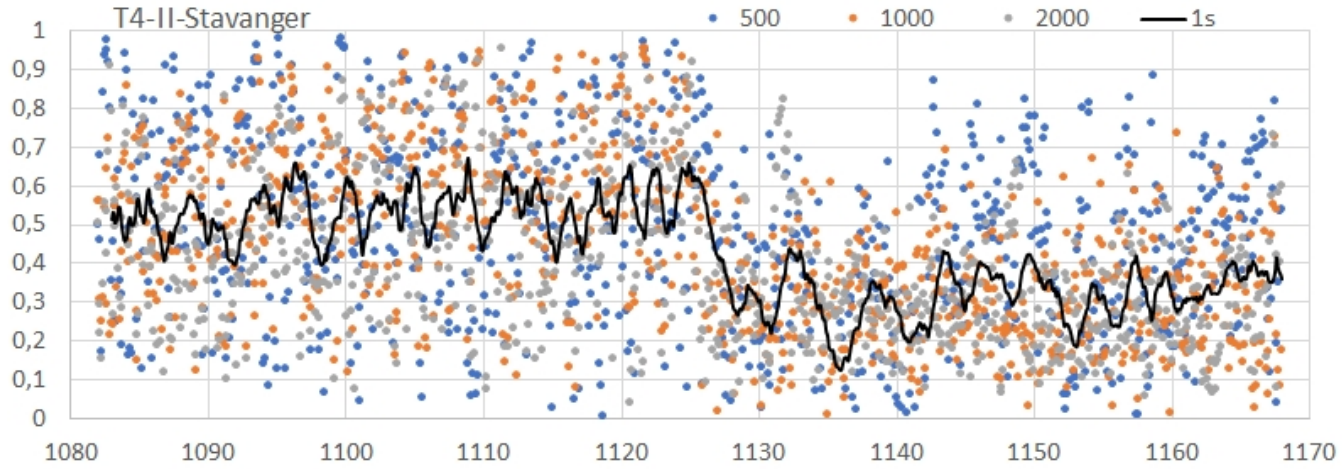
IACC Prokofiev violin concerto, Live and Record



IACC in octave bands







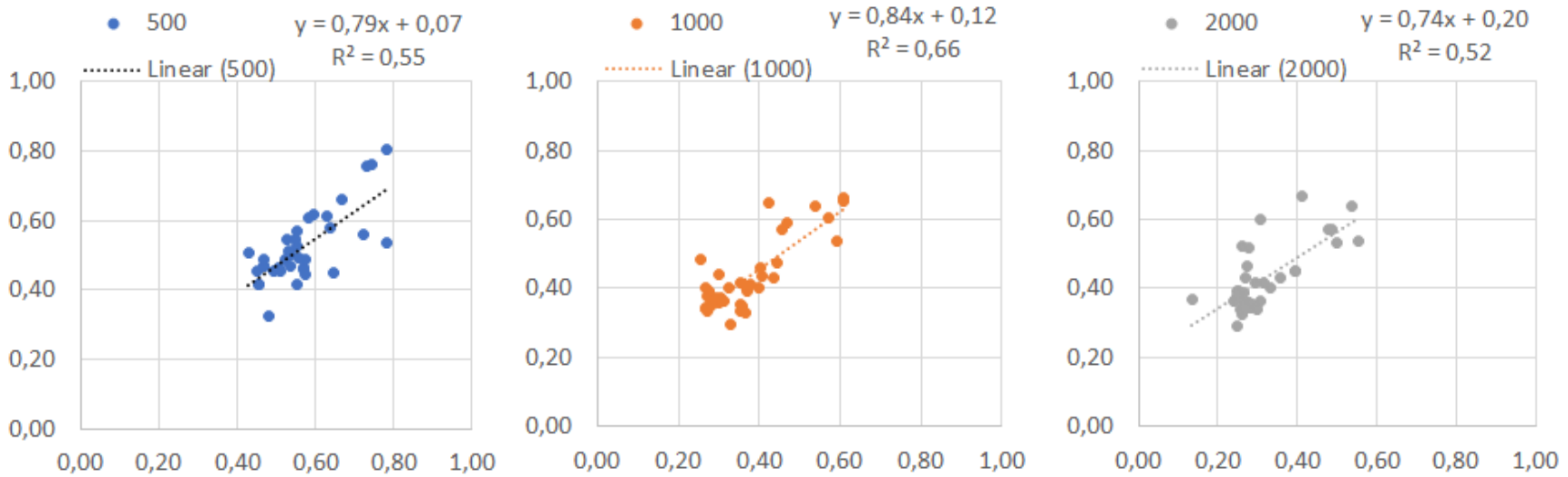
67% of windows are in shaded area
16% of windows are higher
16% of windows are lower

Oboe more Localization cues
- less Envelopment cues

Cellos many Envelopment cues
- wide source
- concentrated in 2 and 4kHz

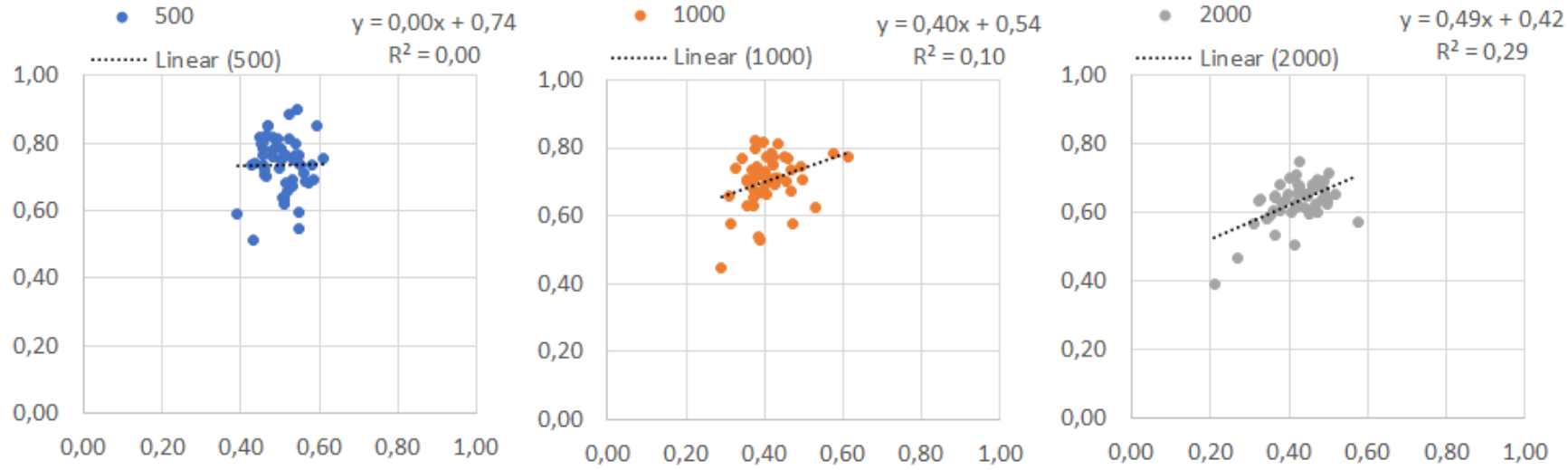
Toward higher, more compressed IACC

Y = Recorded
X= Live



CHANDOS 1984

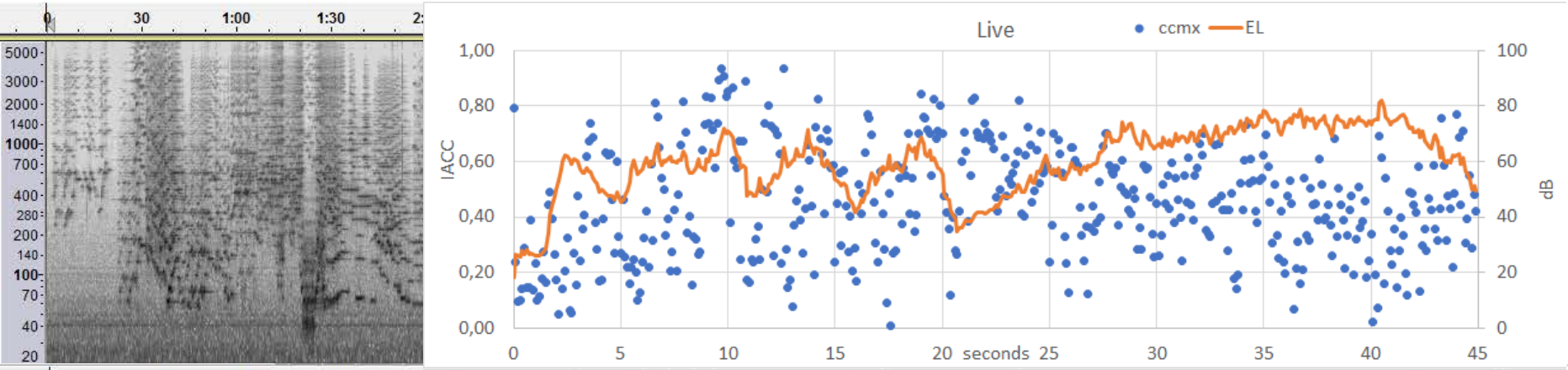
Y = Recorded
X = Live

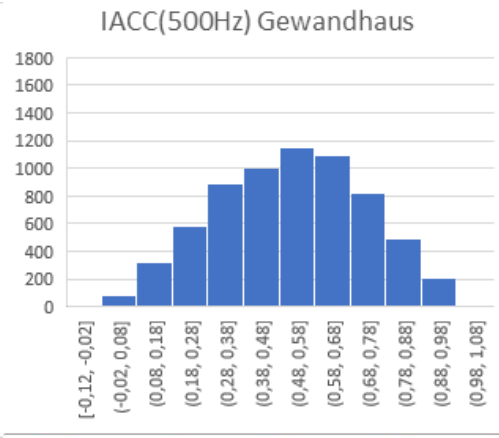


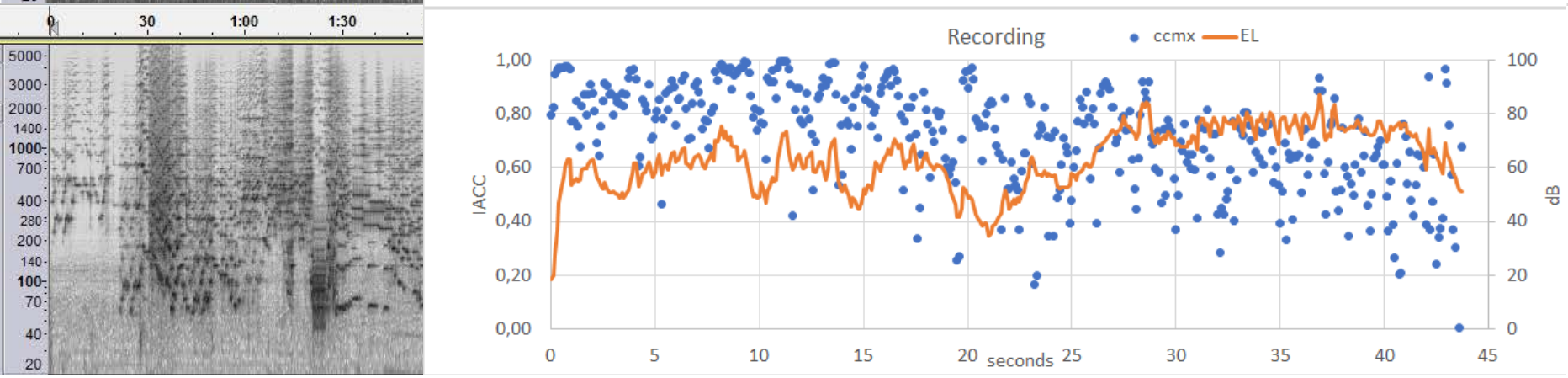
DECCA 2012

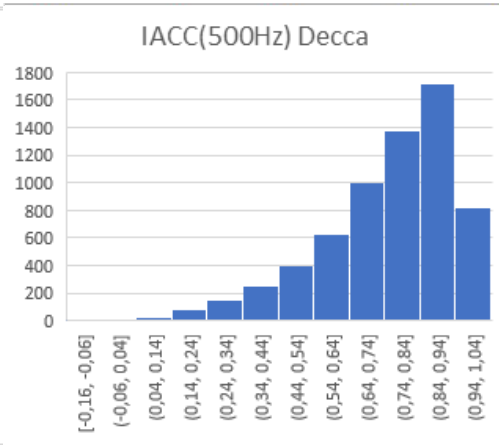
IACC Prokofiev violin concerto, Live and Recorded

Above: Janine Jansen w/ Gewandhaus Orchestra, **live in Gewandhaus** Leipzig









Above: Janine Jansen w/ London Philharmonic, **Decca recording**