

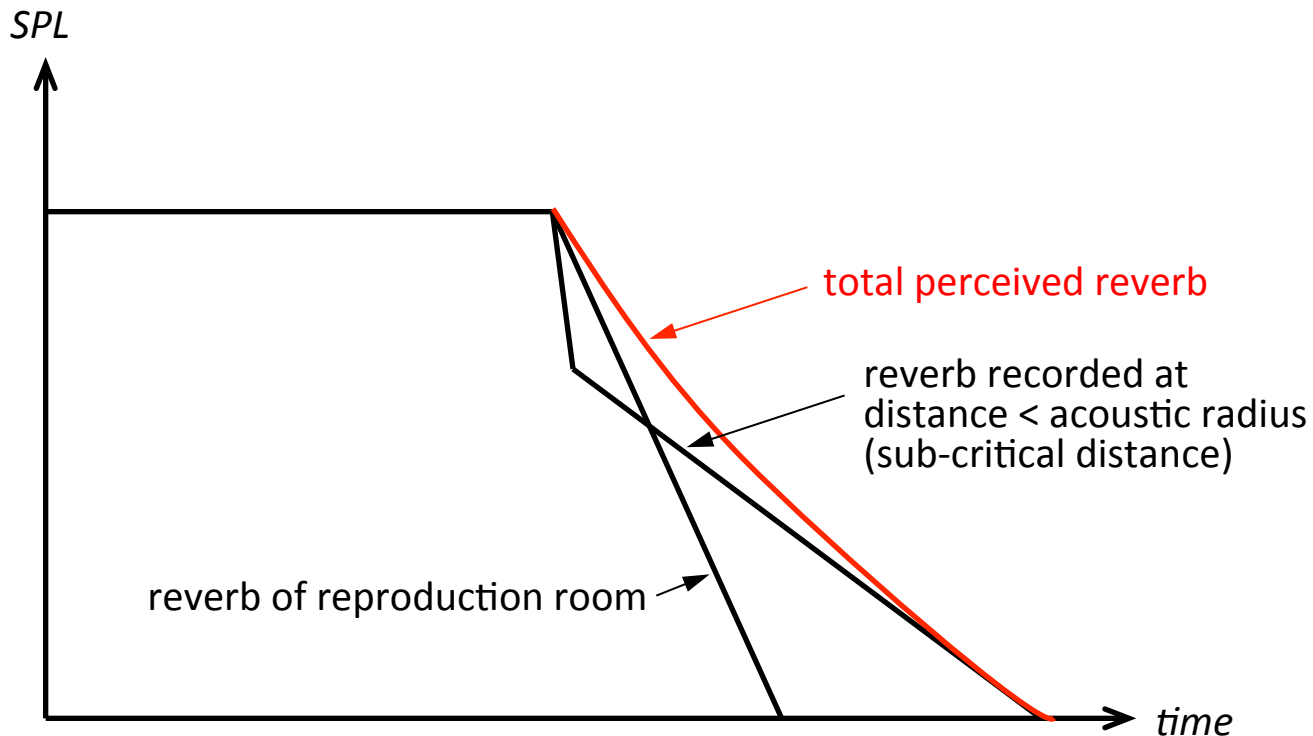
Active Velocity Acoustic Absorber



ACTIVE
VELOCITY
ACOUSTIC
ABSORBER

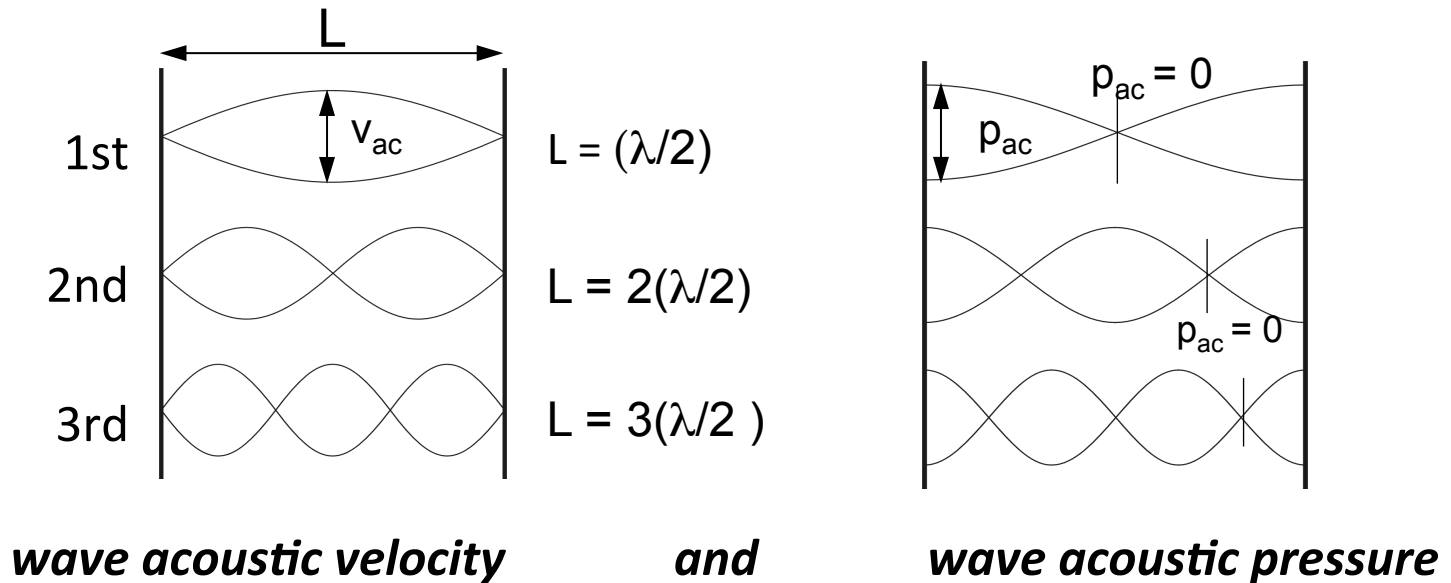
Why is the AVAA necessary

- The combination of reverb during recording and during reproduction must not exceed the reverb desired by the author of the acoustic message.



Why is the AVAA necessary

- In a closed space, stationary waves can occur due to wall reflections.
- A simple “axial mode” is a reverberation where the room’s dimensions (L) contain an integer number of half wave length ($\lambda/2$).

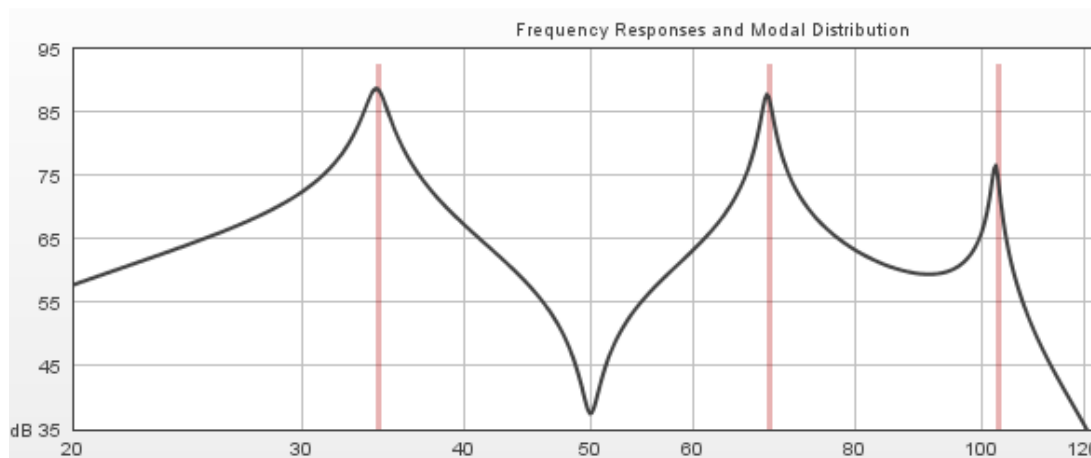
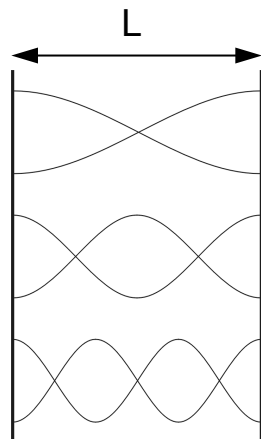


On a wall, the acoustic pressure is maximal and acoustic velocity minimal.

Why is the AVAA necessary

- Instant superposition of modal pressures create, at one frequency, the well know maximal and minimal acoustic pressure, depending of our position in the room:
 - pressure “peaks” or maxima create “keynote”,
 - pressure “nulls” or minima reduce homogeneity.

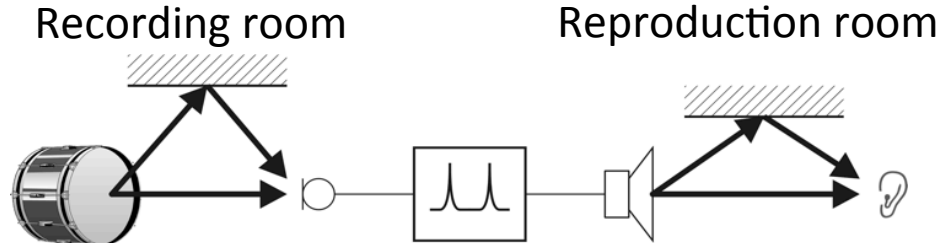
Both are causes of errors for the sound engineer.



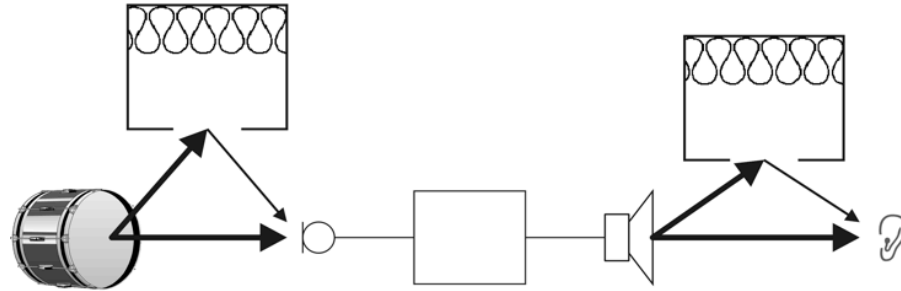
microphone at 3/5 of the length of the room, $L = 5$ m

Processes

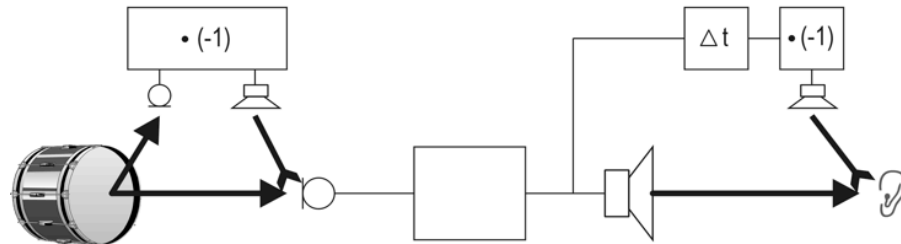
- EQ



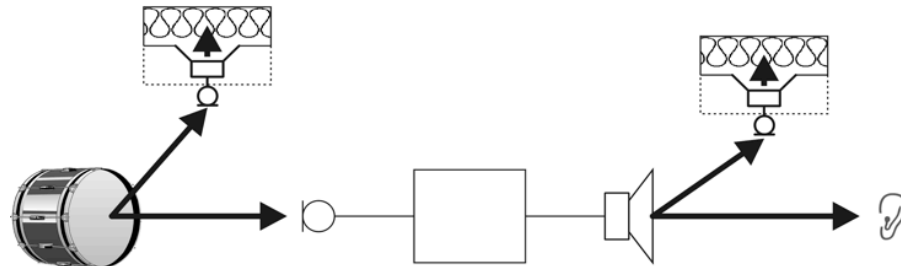
- Bass-trap



- Noise cancelling

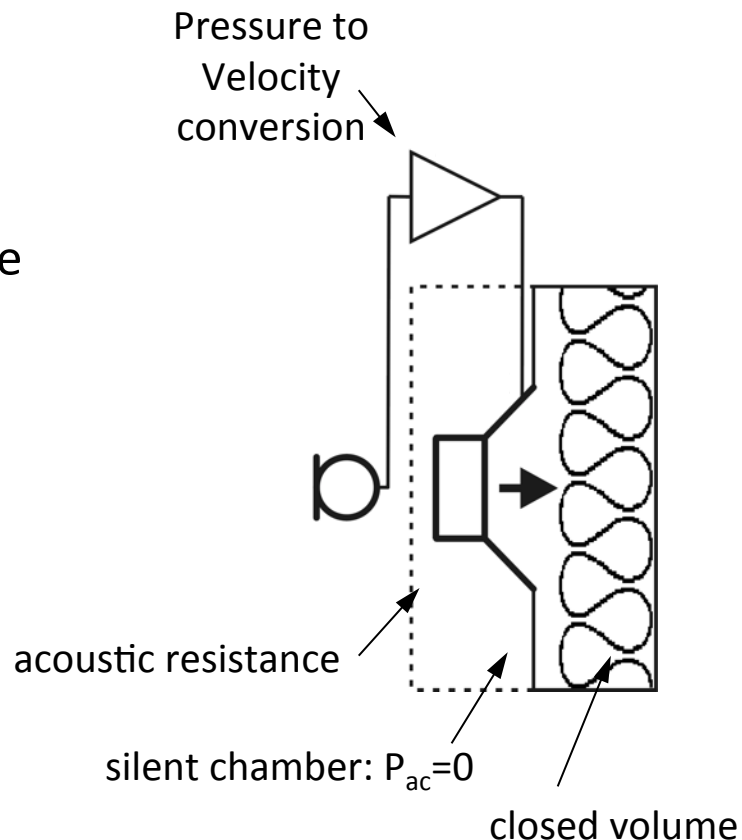


- Anti-wall



Processes

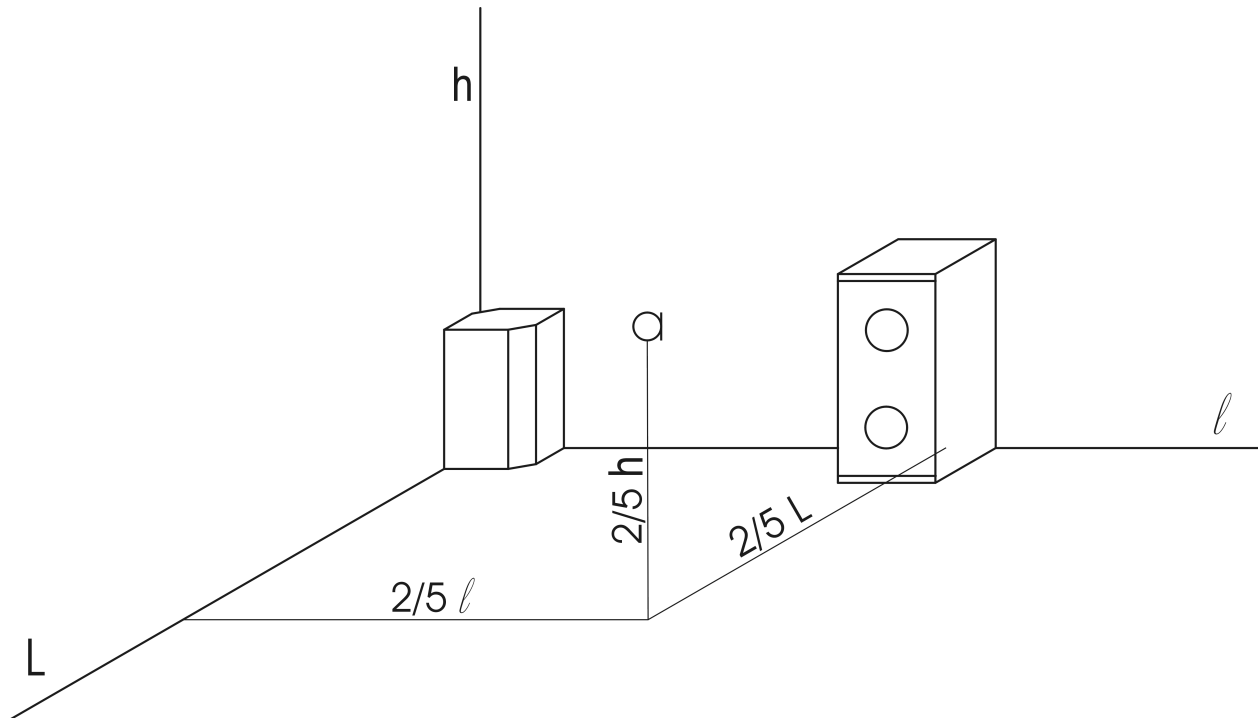
- A microphone measures the acoustic pressure in front of an micro perforated sheet with specific acoustic resistance
- A electronic treatment converts this pressure into the resulting acoustic velocity through the acoustic resistance
- The transducer's acoustic velocity is set to achieve zero acoustic pressure behind the fabric, i.e. in the “silent chamber”.



- A **wall** transforms the energy of the acoustic velocity into energy of acoustic pressure
- The **AVAA** converts energy of the acoustic pressure into energy of velocity: we can therefore call it a “wall-suppression”.

Prototypes and trials

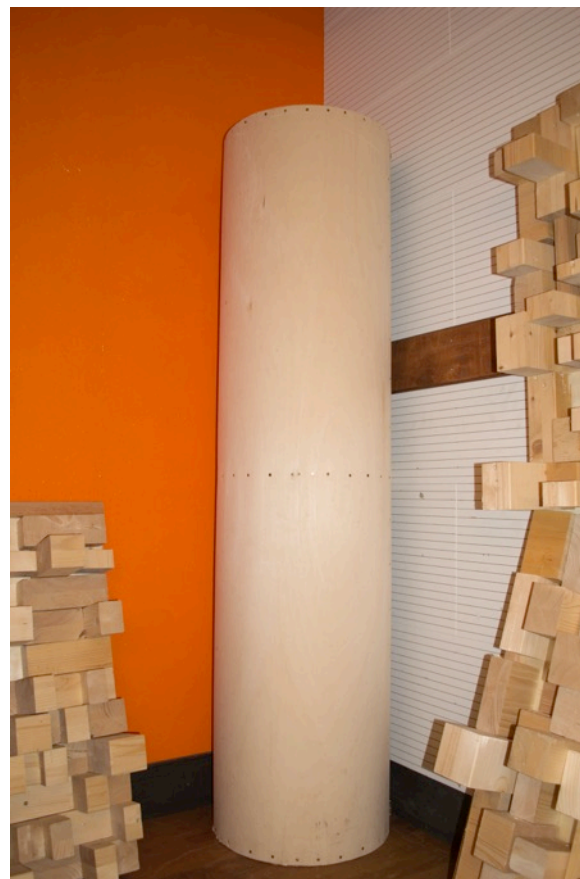
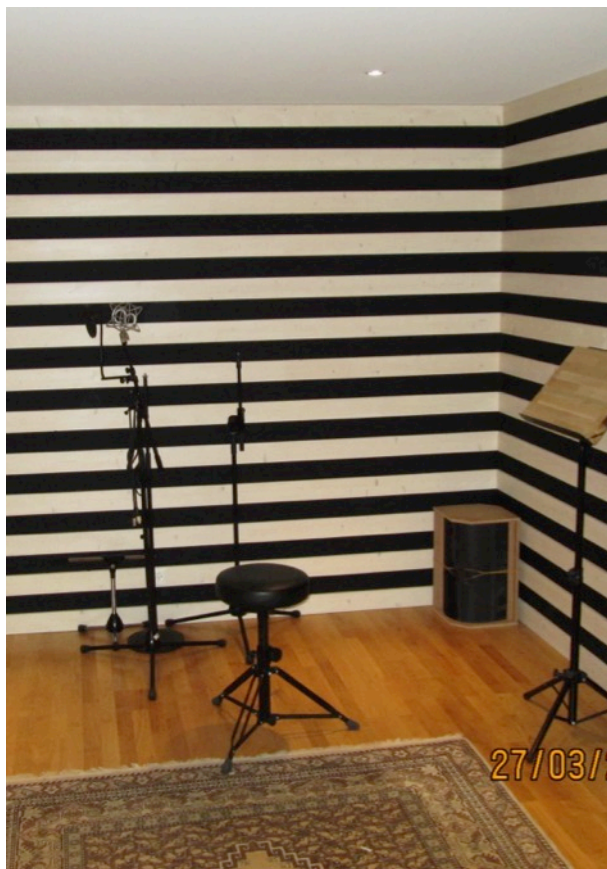
- For testing, 4 AVAA were positioned in the corners on the floor of the studio.



Prototypes and trials

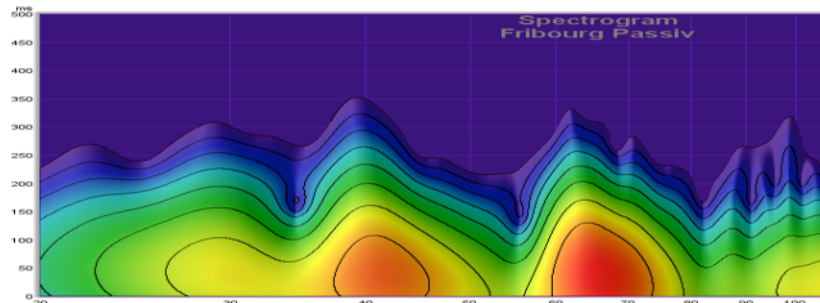
- The AVAA, smaller than 50 dm³,...

...is compared to a bass trap of over 500 dm³.

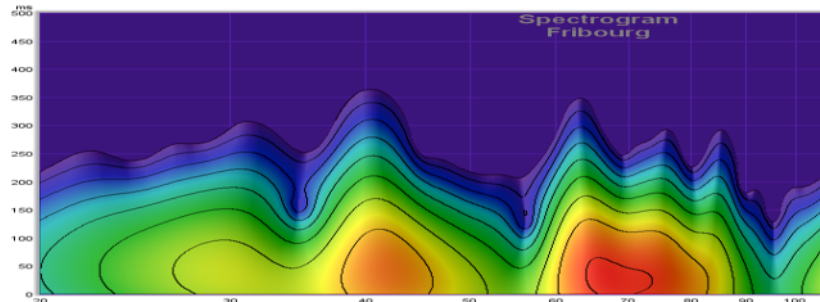


Prototypes and trials

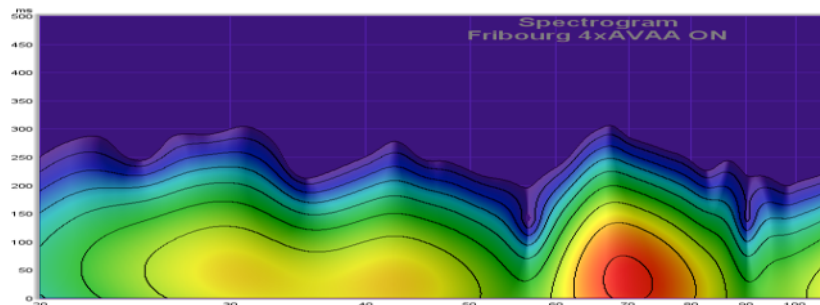
- Absorbing wall with bass trap



- Absorbing wall alone

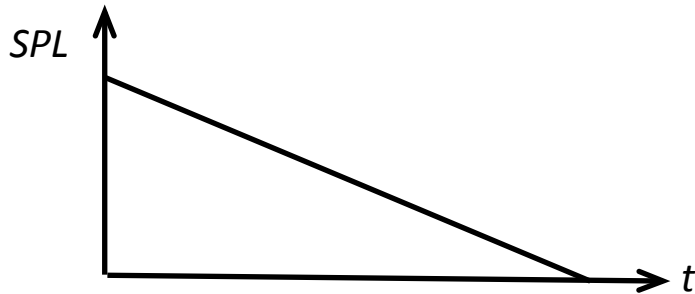


- Absorbing wall with AVAA



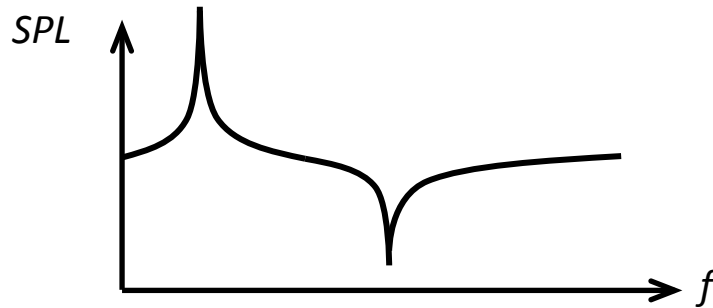
Auditory perception

- A specific mode influences the auditory perception in time, frequency and space.



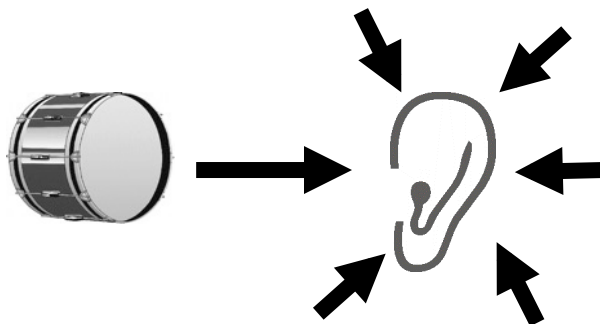
Time:

the pulse is extended.



Frequency:

pressure “peaks” create “keynote”,
pressure “nulls” reduce homogeneity.



Space:

sound is perceived as a hum coming
from everywhere and nowhere.

Key advantages

- Stable with no setting or calibration required
- No sound emitted, no alteration of direct sound
- Significantly reduces the modal reverberation time in low frequencies
 - The location of the sound source is more accurate
 - Other frequencies are uncovered and easily to identify (sound masking effect is reduced)
- Can easily be switched on and off to adapt the acoustic environment
- Modular, small footprint, movable asset