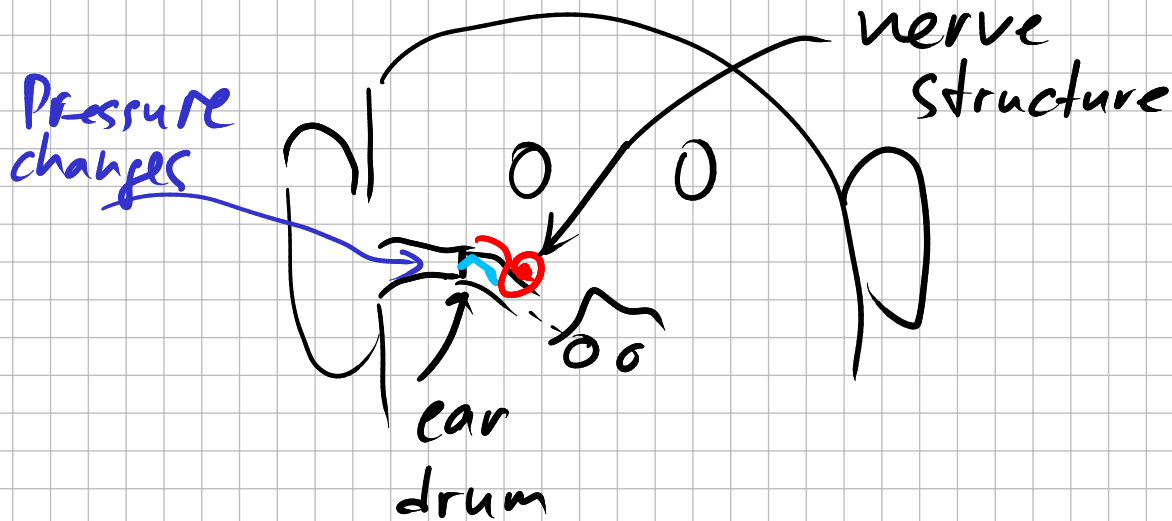


Sound



Pressure monitor
for air waves

⇒ force measurement



Directionality



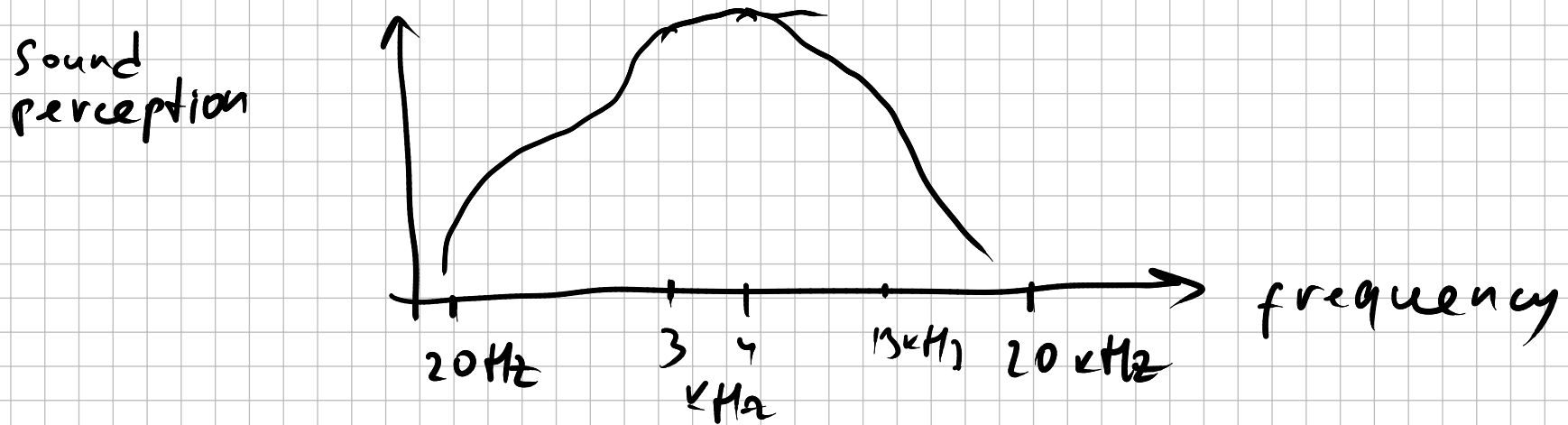
Source of sound

- 1) time delay
(phase shift)
- 2) change of loudness
but this is too small
- 3) casting shadow

Sound

→ loudness

→ pitch ↔ frequency of vibrations



Sound is just vibration
not necessary at the human perception
frequency

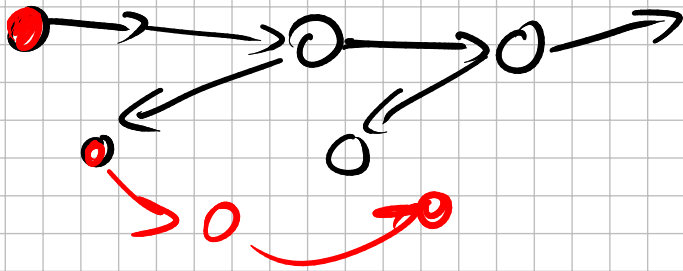
dB → deci Bell

$$= 10 \log_{10} \frac{P}{P_{\text{reference}}}$$

$$10 \log_{10} \frac{10 P_{\text{ref}}}{P_{\text{ref}}} = 10 \cdot \underbrace{\log_{10} 10}_{=1} = 10 \text{ dB}$$

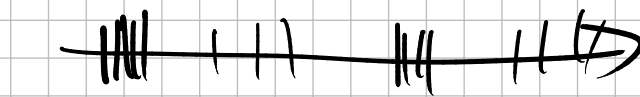
Sound propagation

200-300 m/s



sound is not only in air
but in liquids and solids.

In solids → up to 3 ways to transmit



but in fluids only this one

