

# (INFORMATICA PER LE) DIGITAL HUMANITIES

LECTURE 4  
MARCH 22 2024





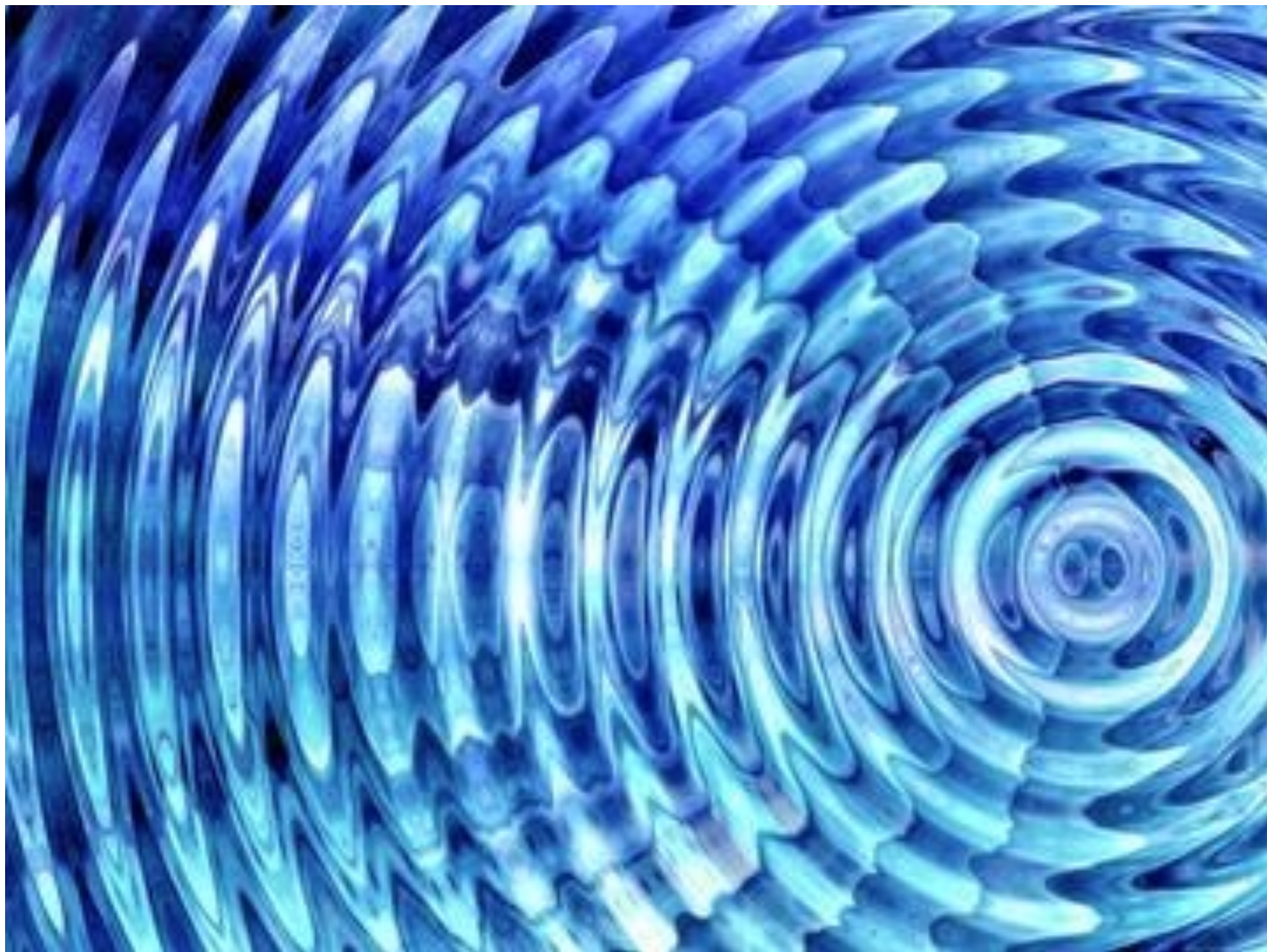














The background of the image is a complex, abstract pattern of swirling, concentric shapes in various shades of blue and cyan. The pattern has a sense of depth and movement, resembling a close-up of a textured surface or a digital visualization of a wave or vibration. The colors range from deep, dark blues to bright, almost white highlights, creating a dynamic and energetic visual effect.

# VIBRATIONS



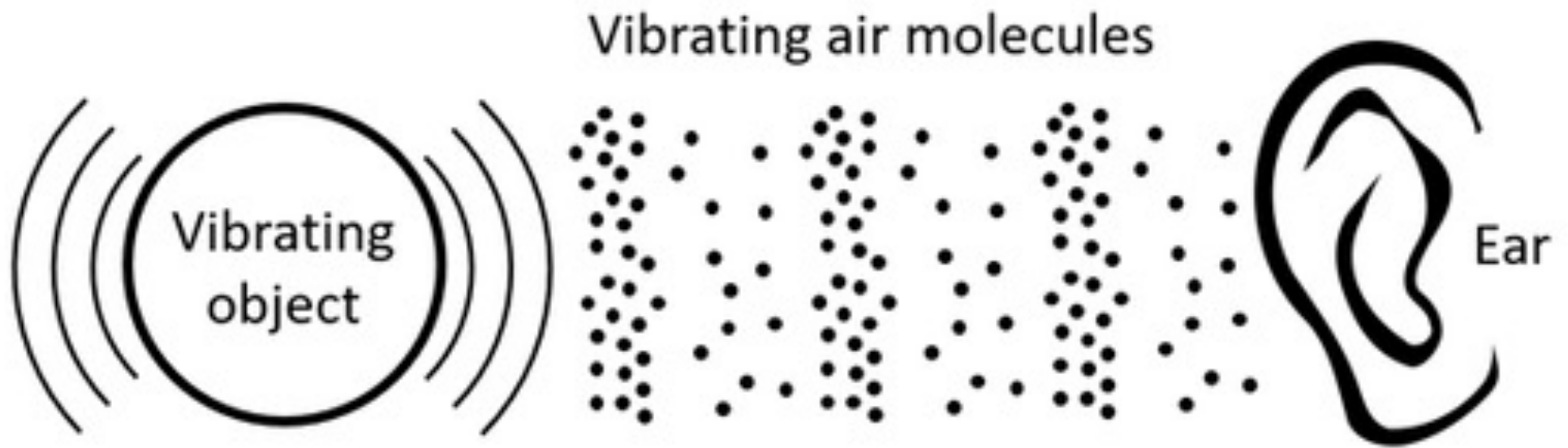
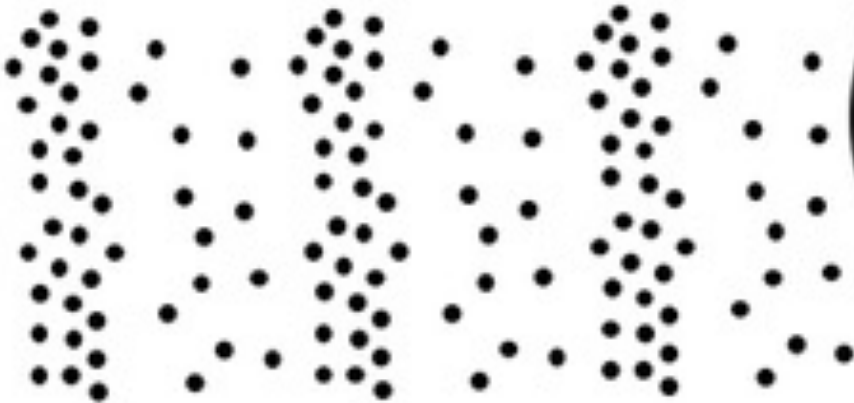


Image courtesy of We Grow Thinkers. (<http://wegrowthinkers.weebly.com/>)



Vibrating air molecules



Ear



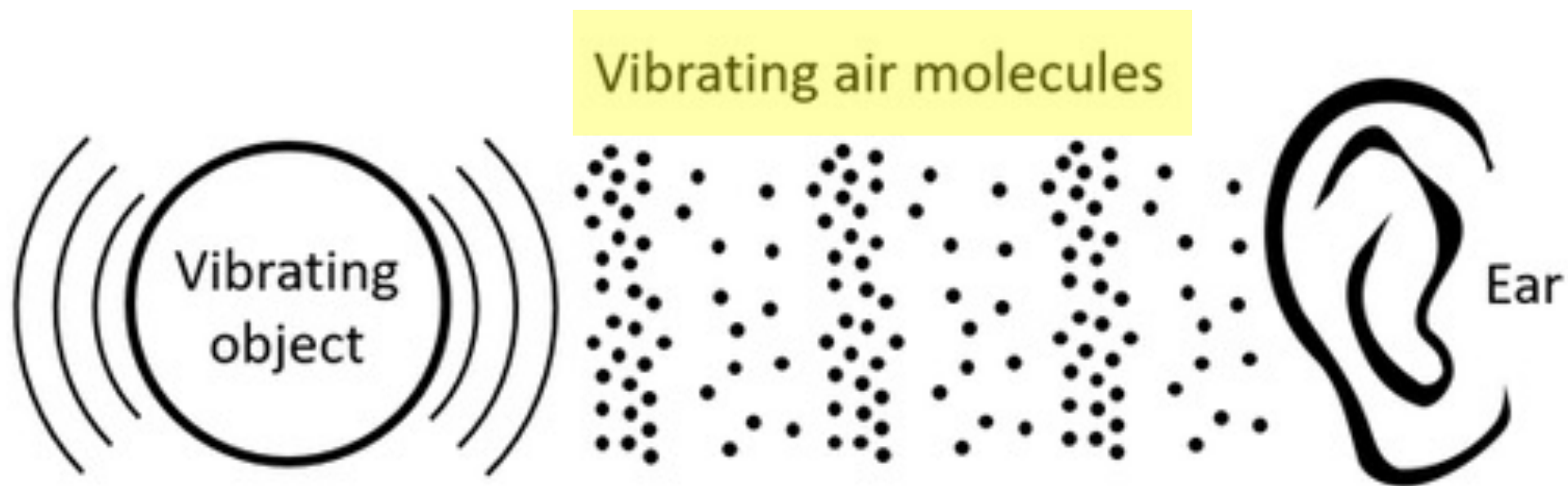






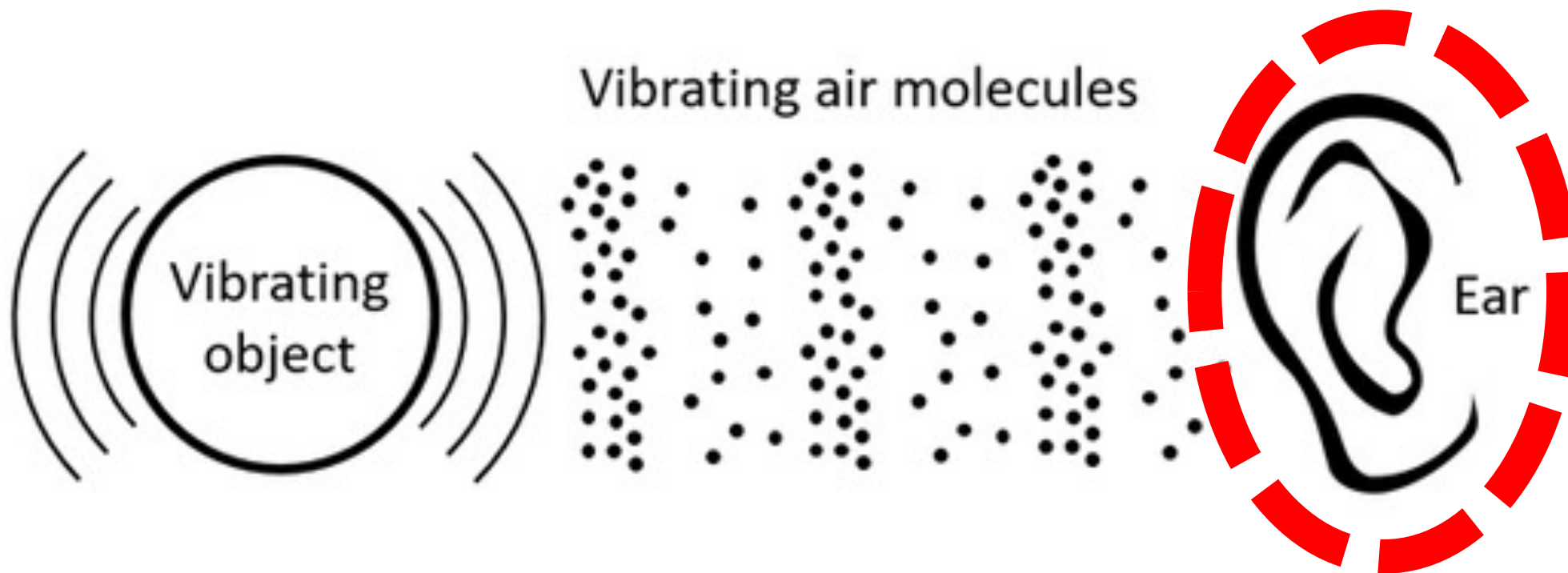


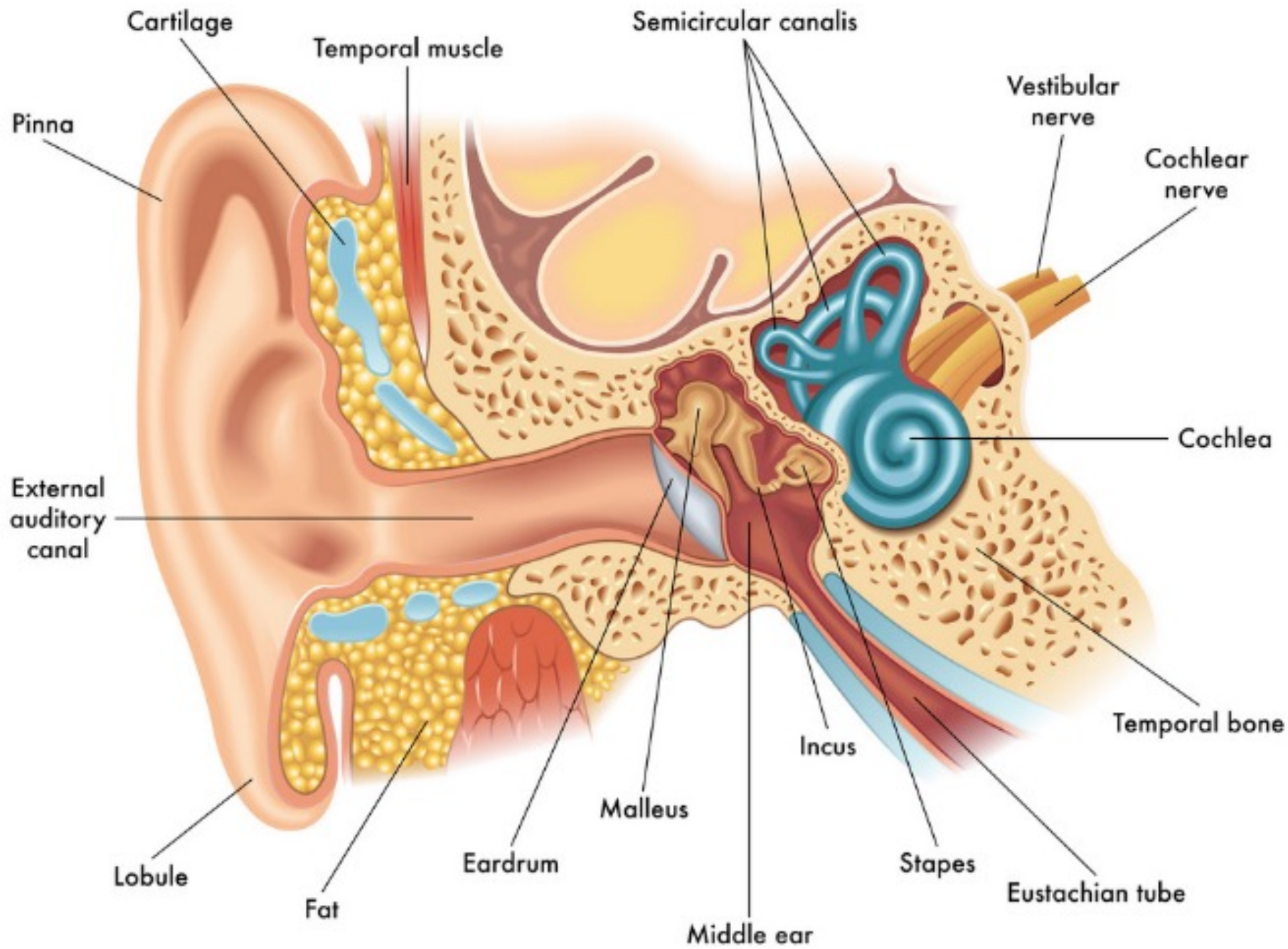
Image courtesy of Tommy Japan 79 on Flickr . (South Vietnam, 1968)



Poster of "Alien" (1979), directed by Ridley Scott.











In June 1883, in the magazine The Chautauquan, the question was asked, “If a tree were to fall on an island where there were no human beings would there be any sound?”

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They then went on to answer the query with, “No. Sound is the sensation excited in the ear when the air or other medium is set in motion.”



The background of the image is a complex, abstract pattern of swirling, concentric shapes in various shades of blue and cyan. The pattern resembles a close-up of a textured surface, possibly a woven fabric or a microscopic view of a material, with a sense of depth and movement. The colors transition from deep blues to lighter, almost white highlights, creating a dynamic and visually rich texture.

# VIBRATIONS



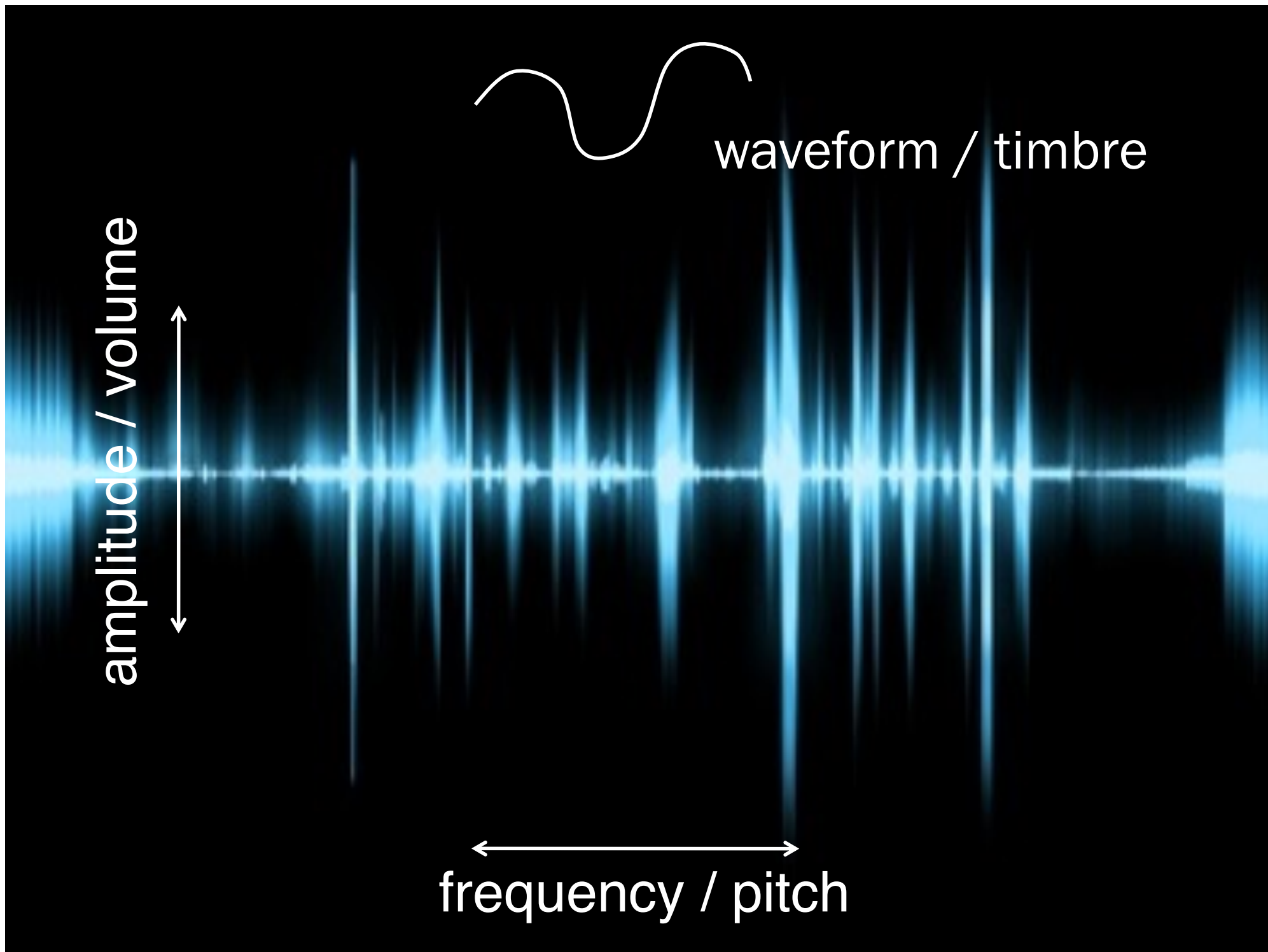


**VIBRATIONS**  
**HITTING**  
**YOUR EAR**







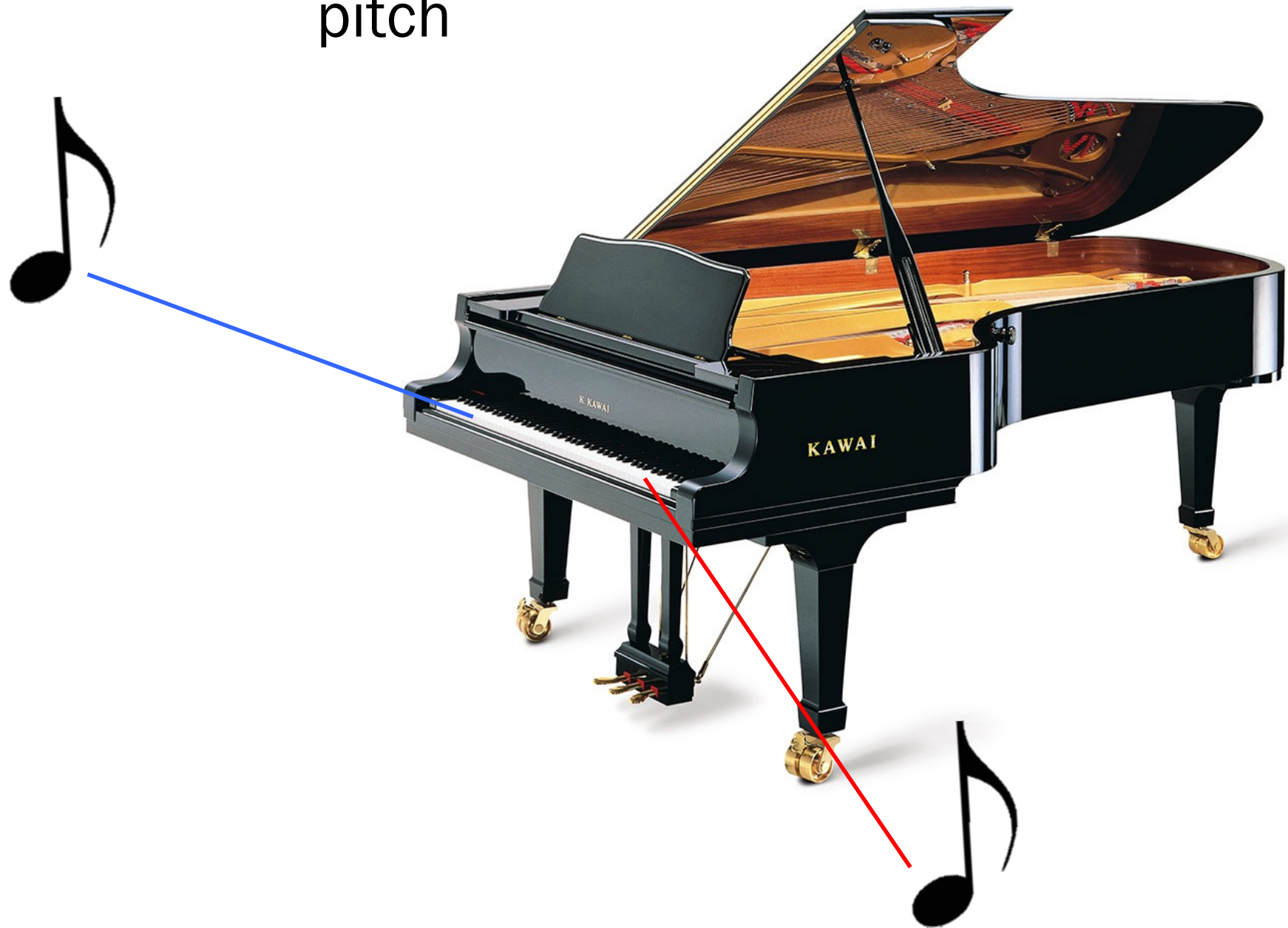


frequency / pitch

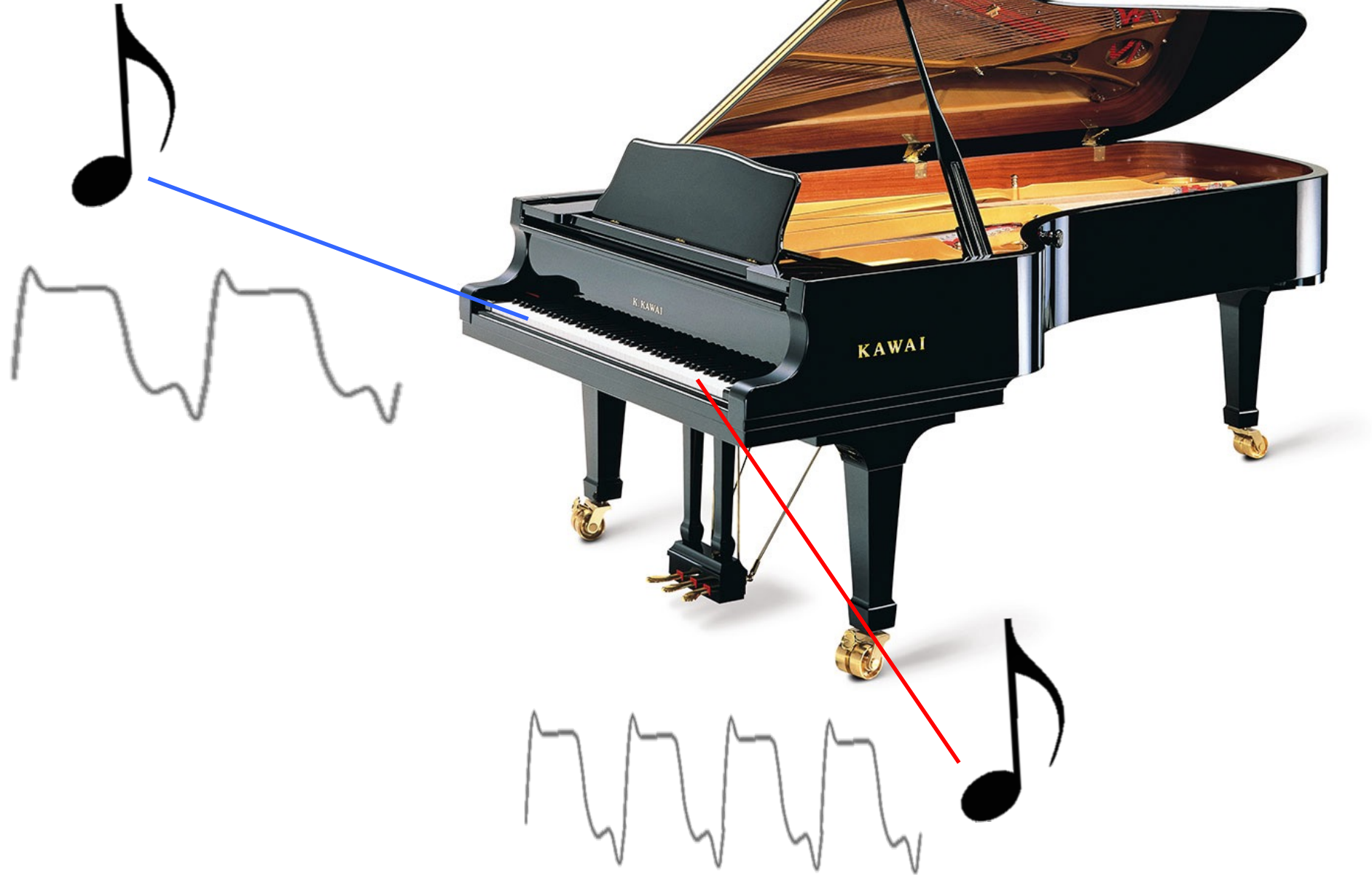




pitch



frequency



amplitude / volume





volume



amplitude

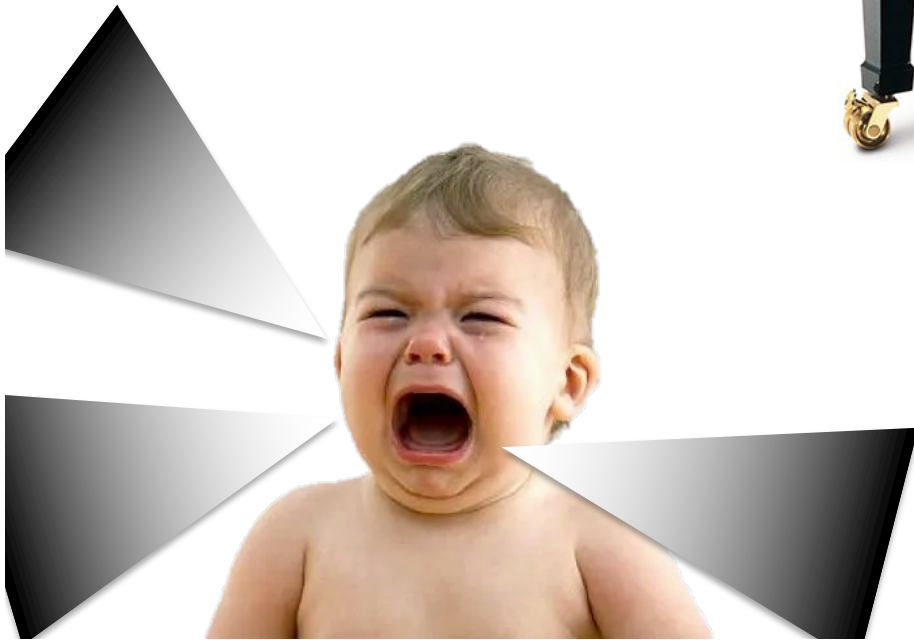


waveform / timbre

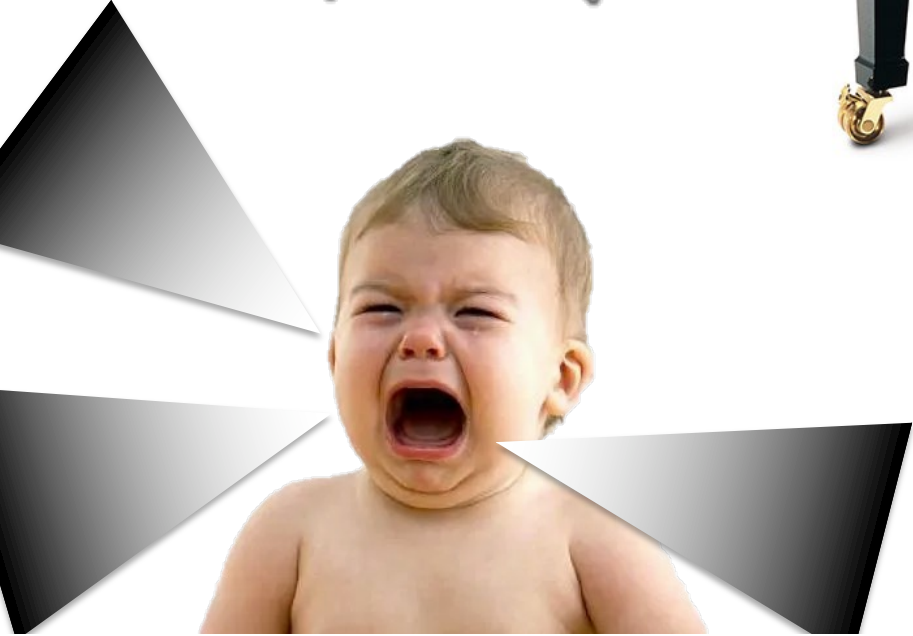




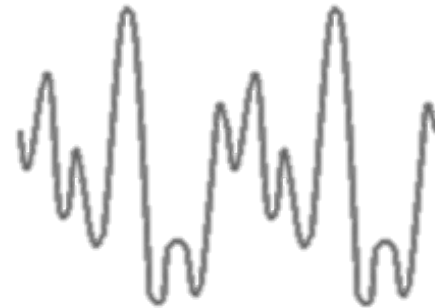
timbre



waveform

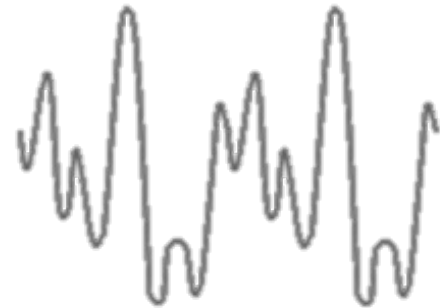


# ACTUALLY...

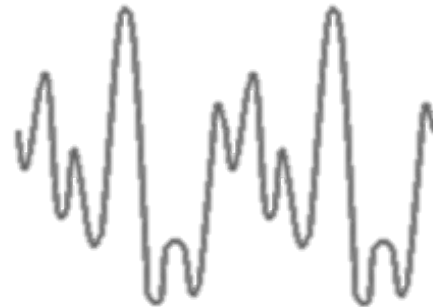




**ACTUALLY...**

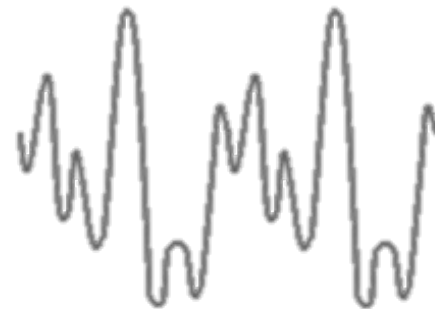


# ACTUALLY...











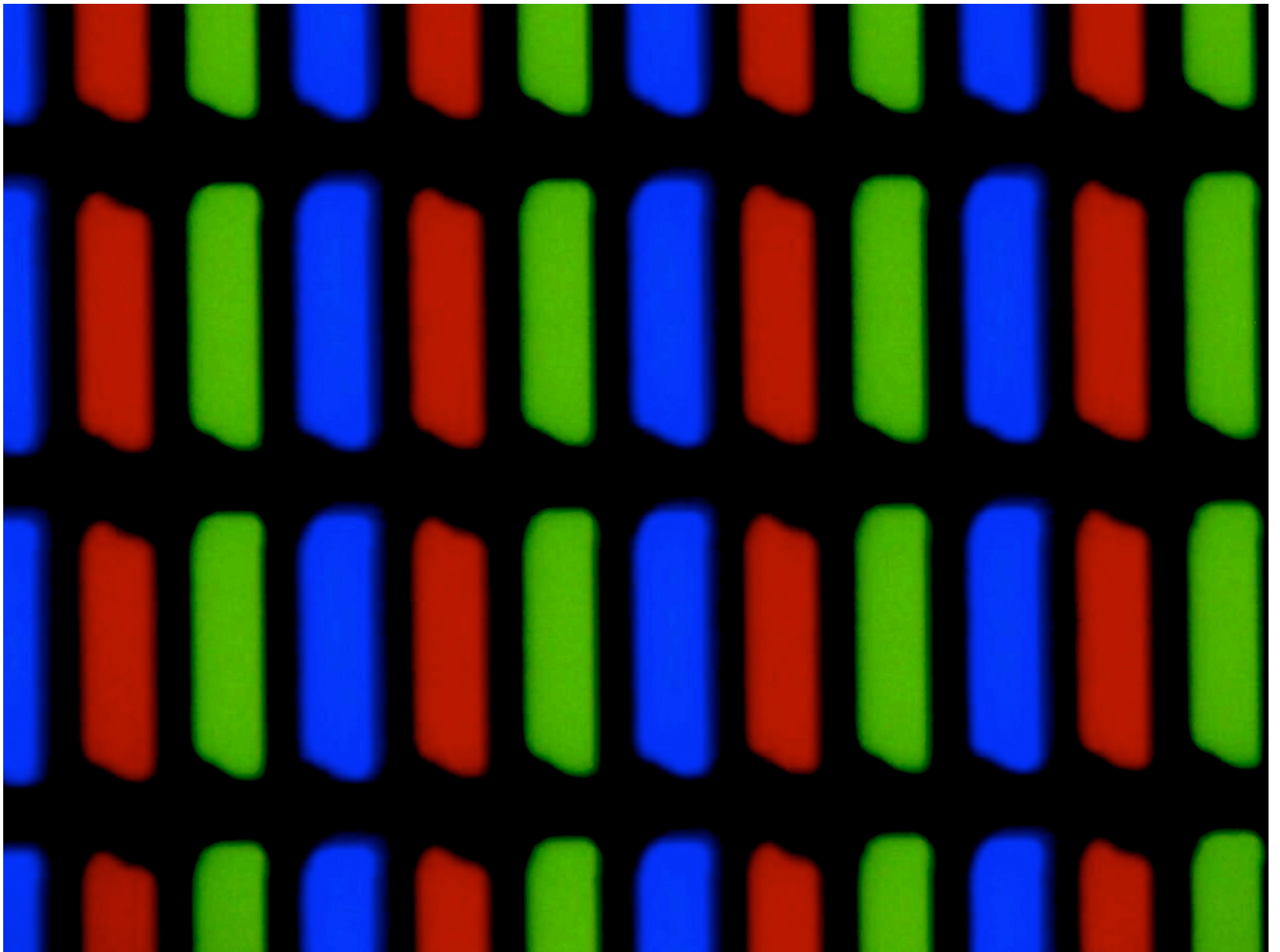


“The Dress”, a viral sensation from 2015 on qualia and subjective perception.

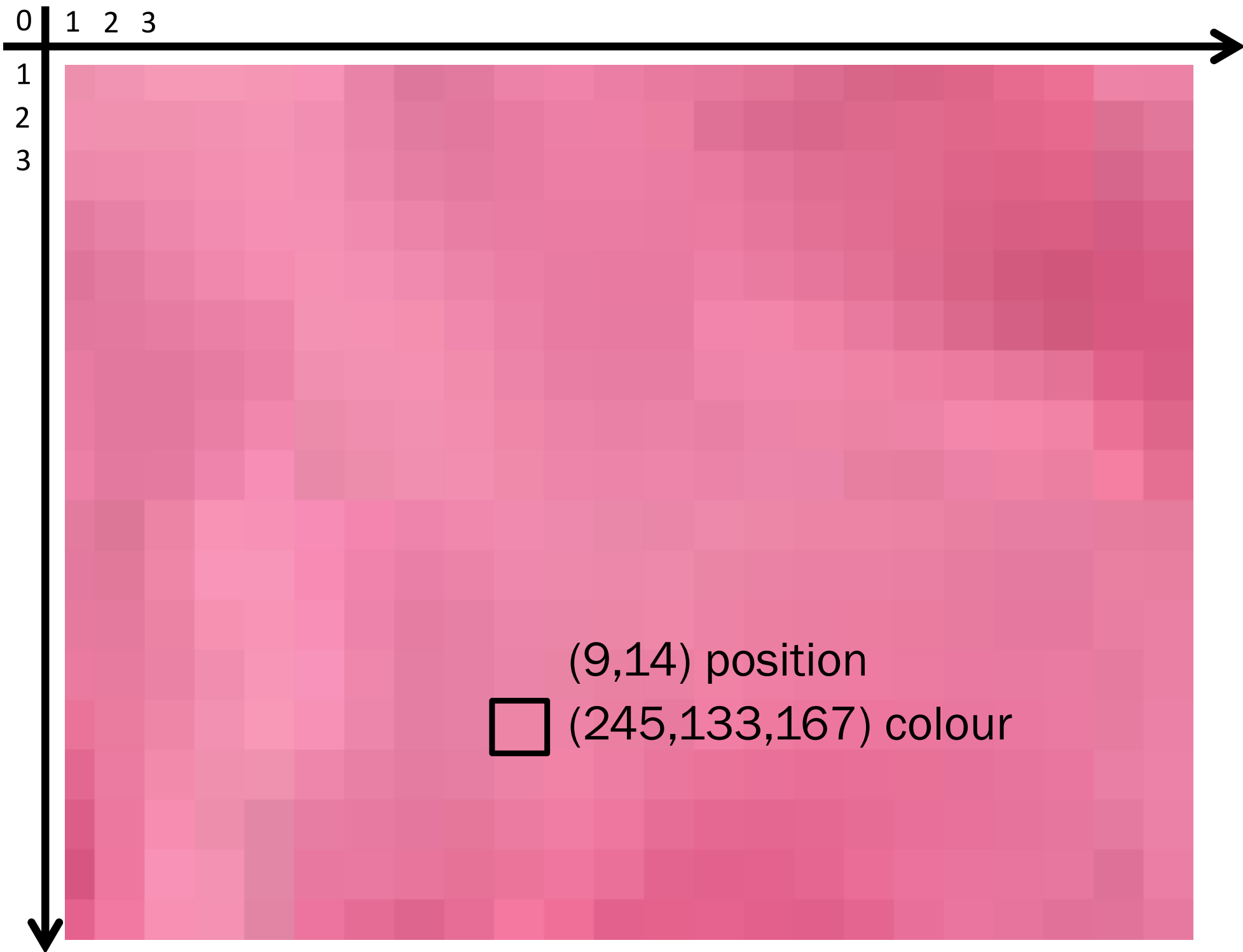


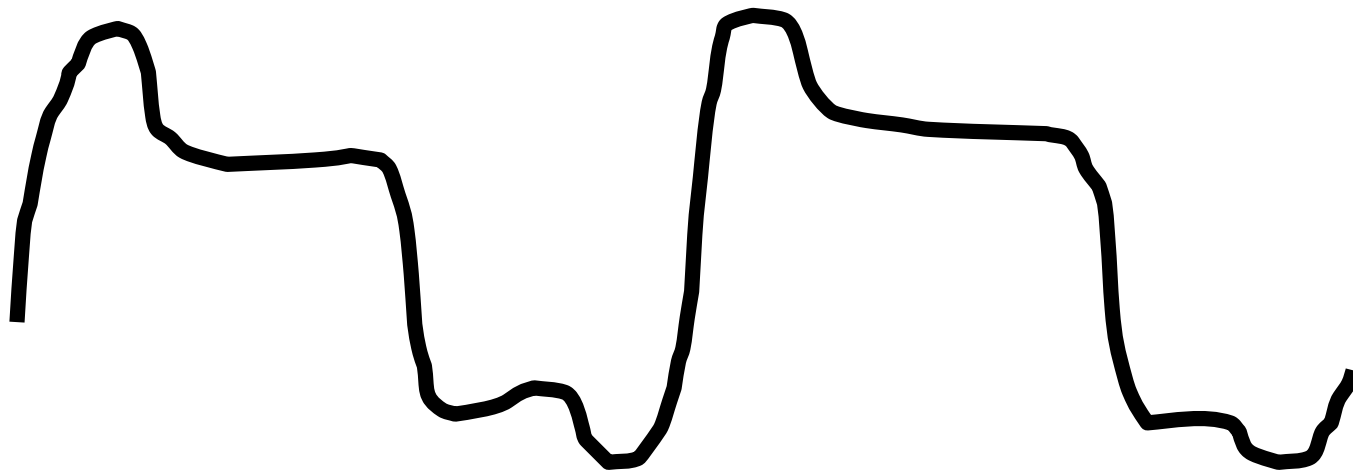


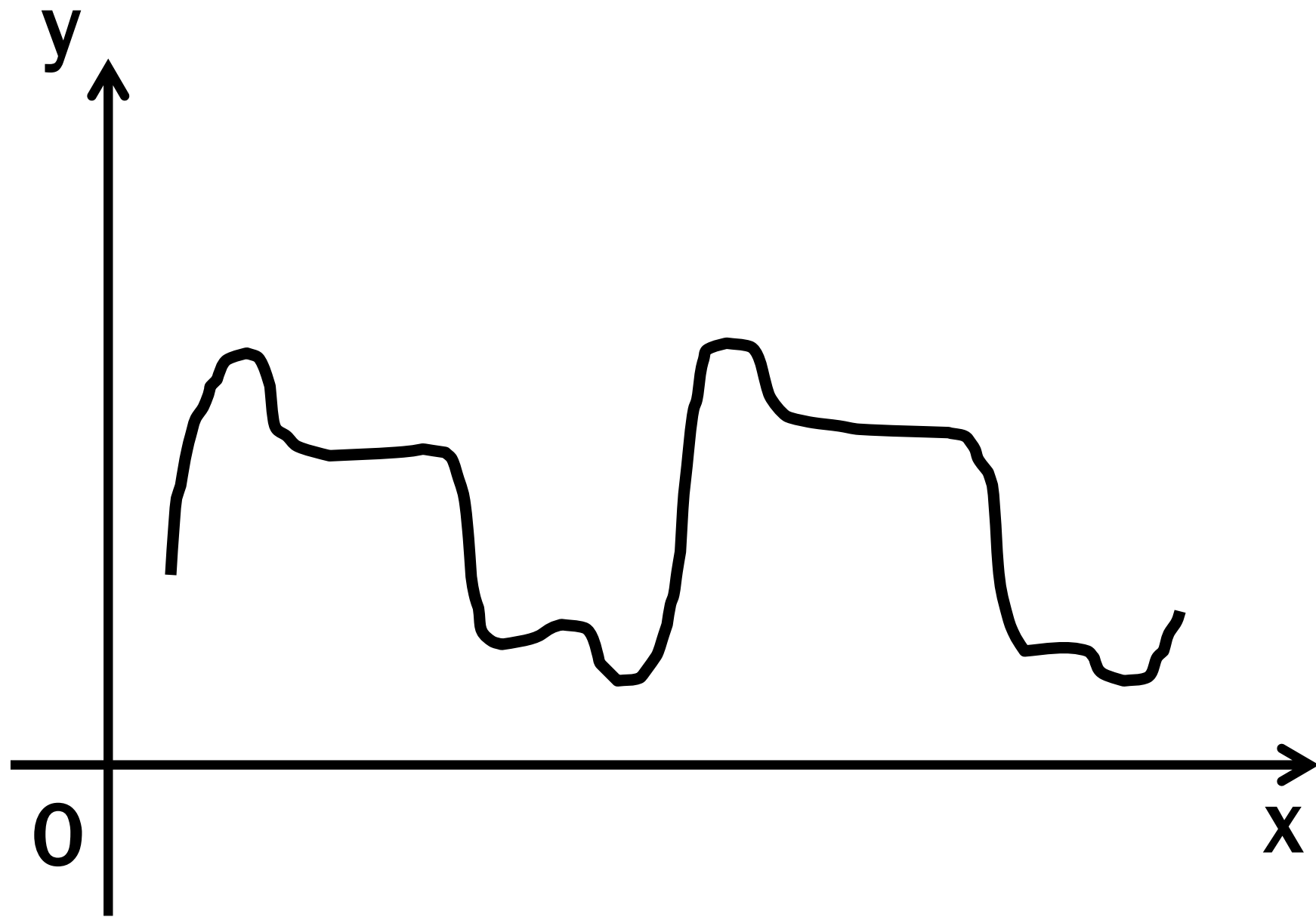




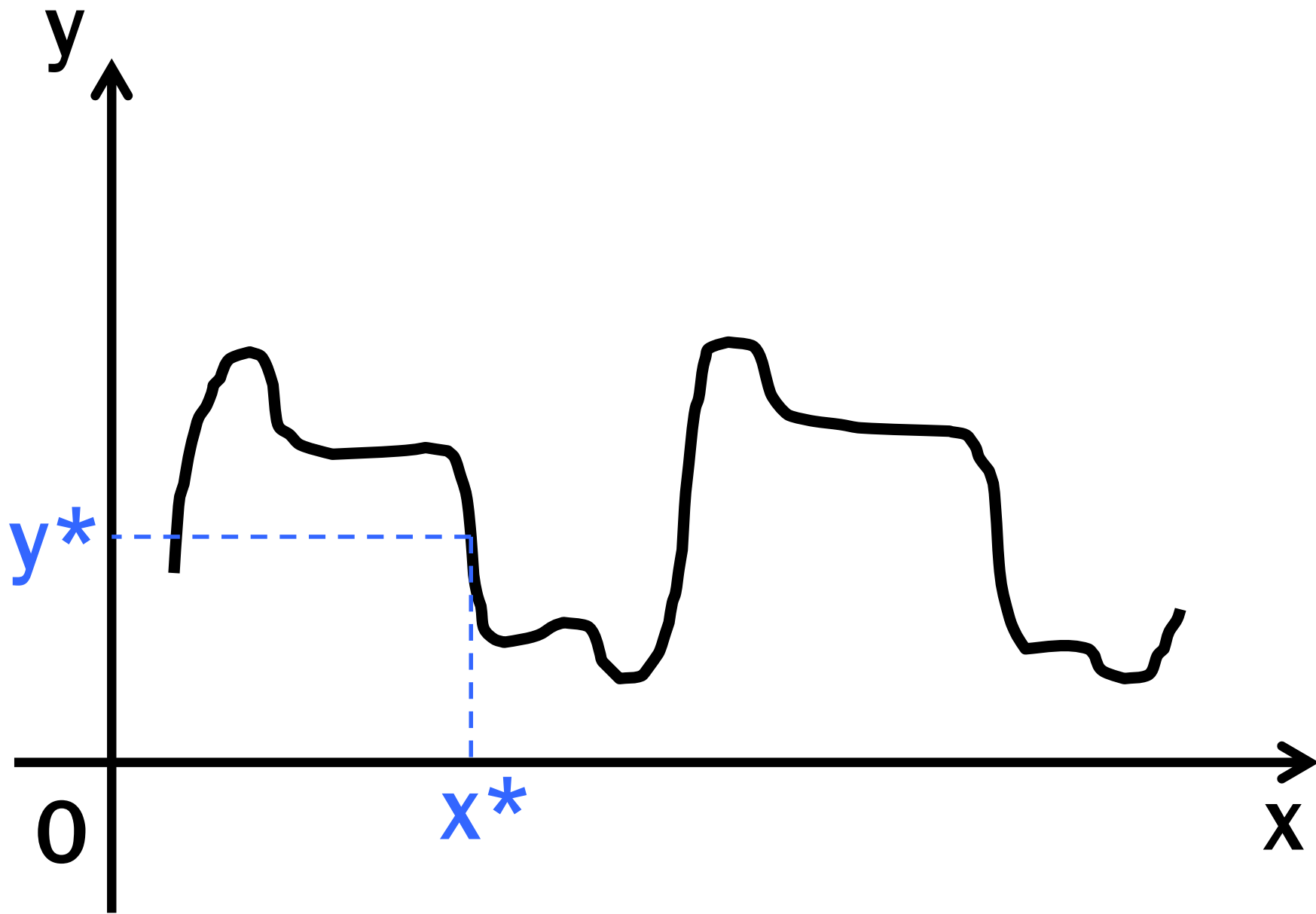


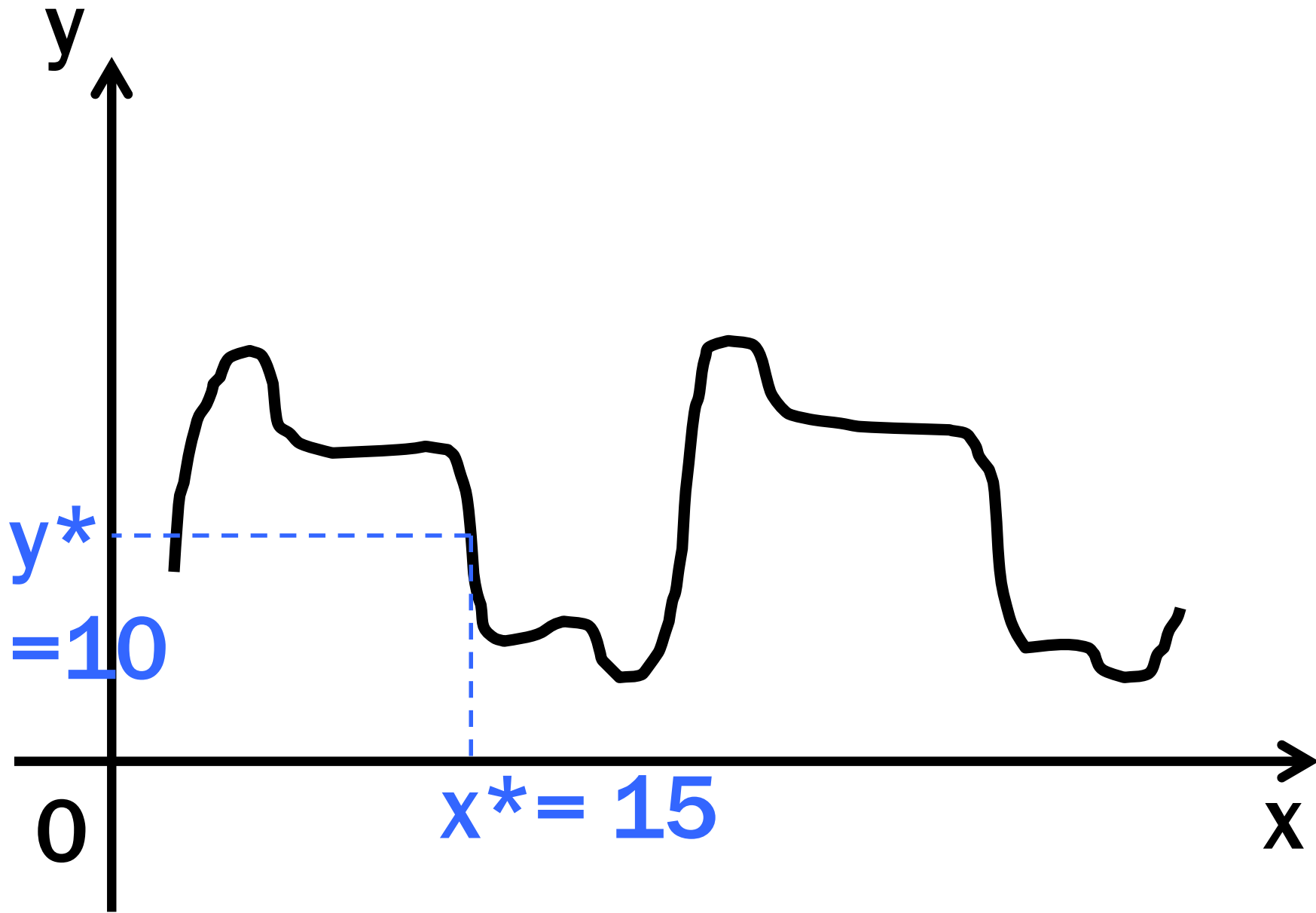


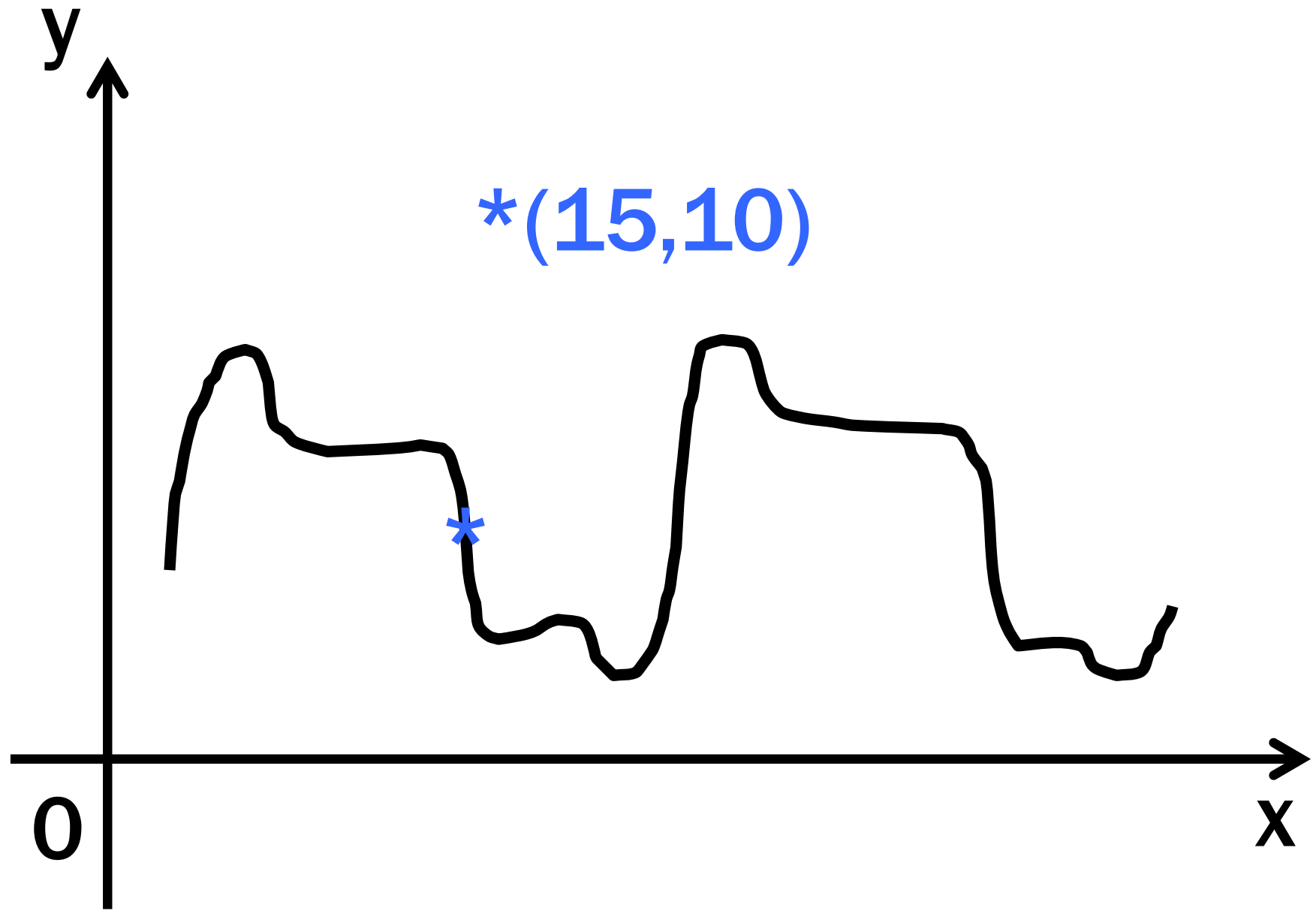




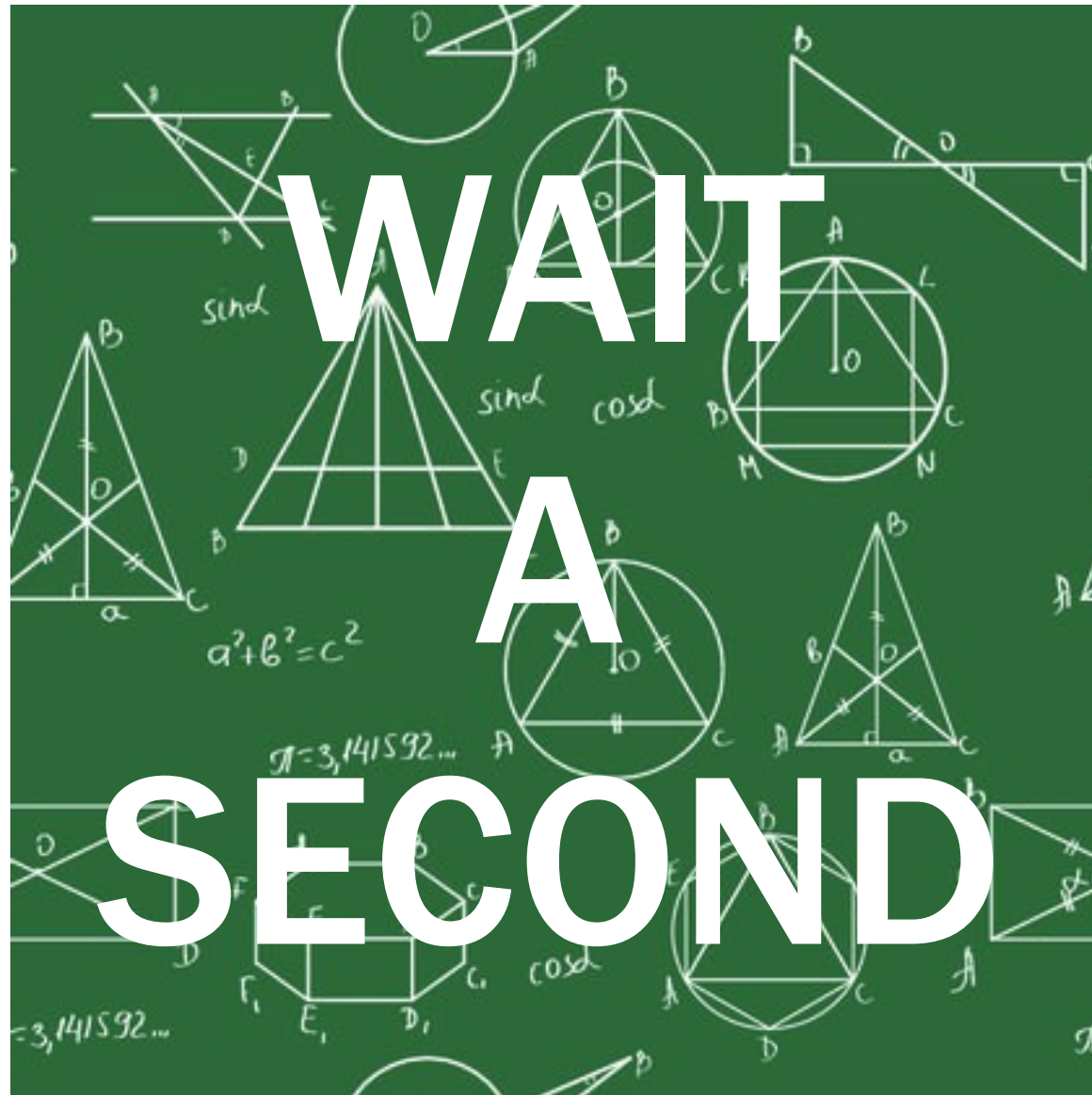


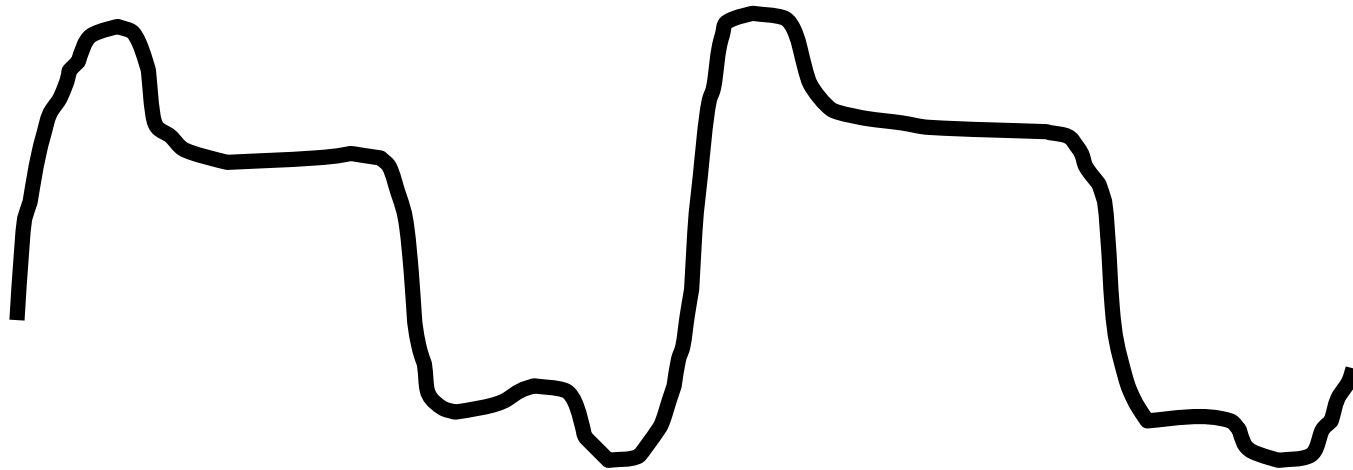




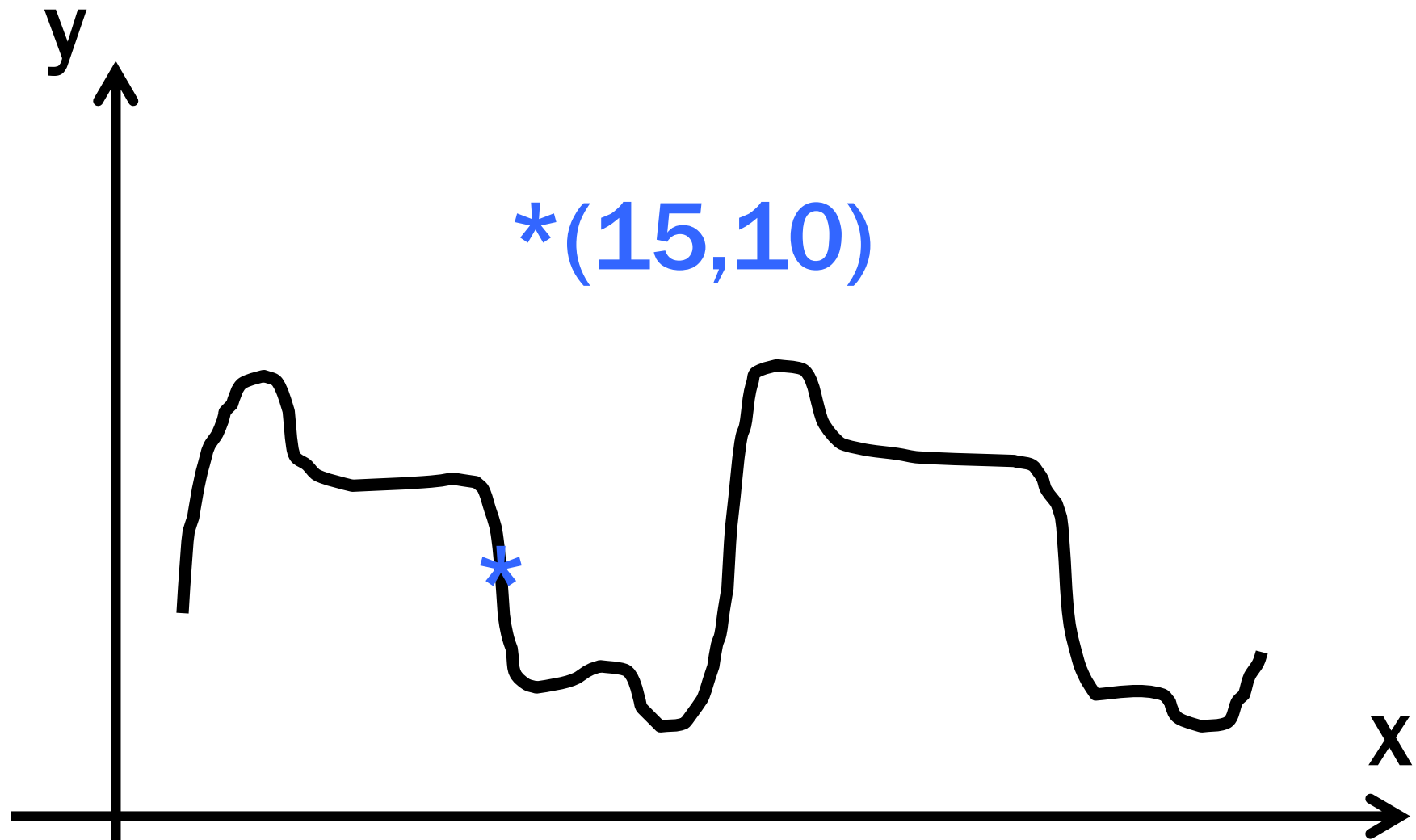




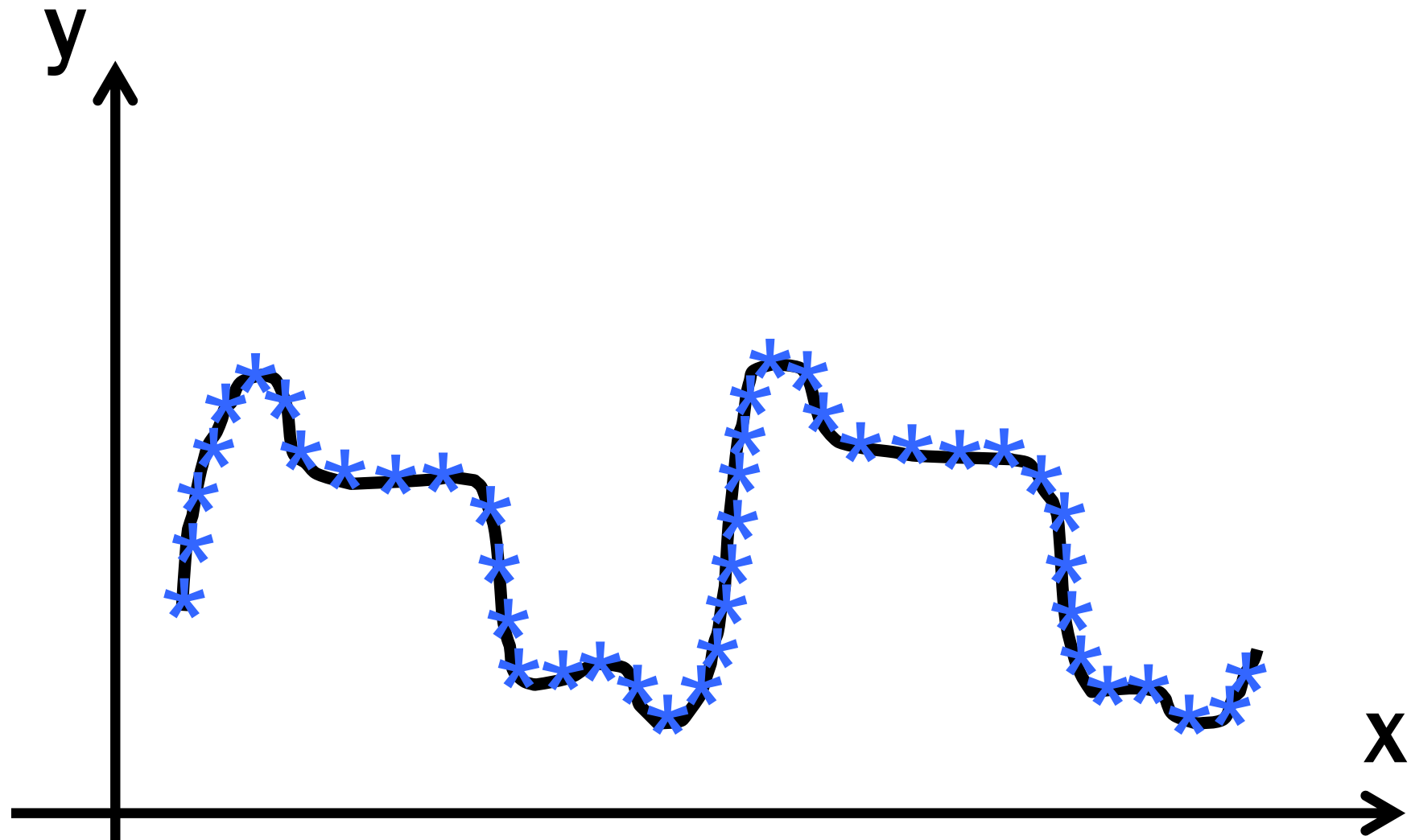




GEOMETRY TEACHES US THAT THERE ARE  
INFINITE POINTS IN A LINE.



0 CAN WE MANAGE COMPUTING THE (X,Y)  
COORDINATES OF AN INFINITE AMOUNT  
OF POINTS? **OBVIOUSLY NOT.**

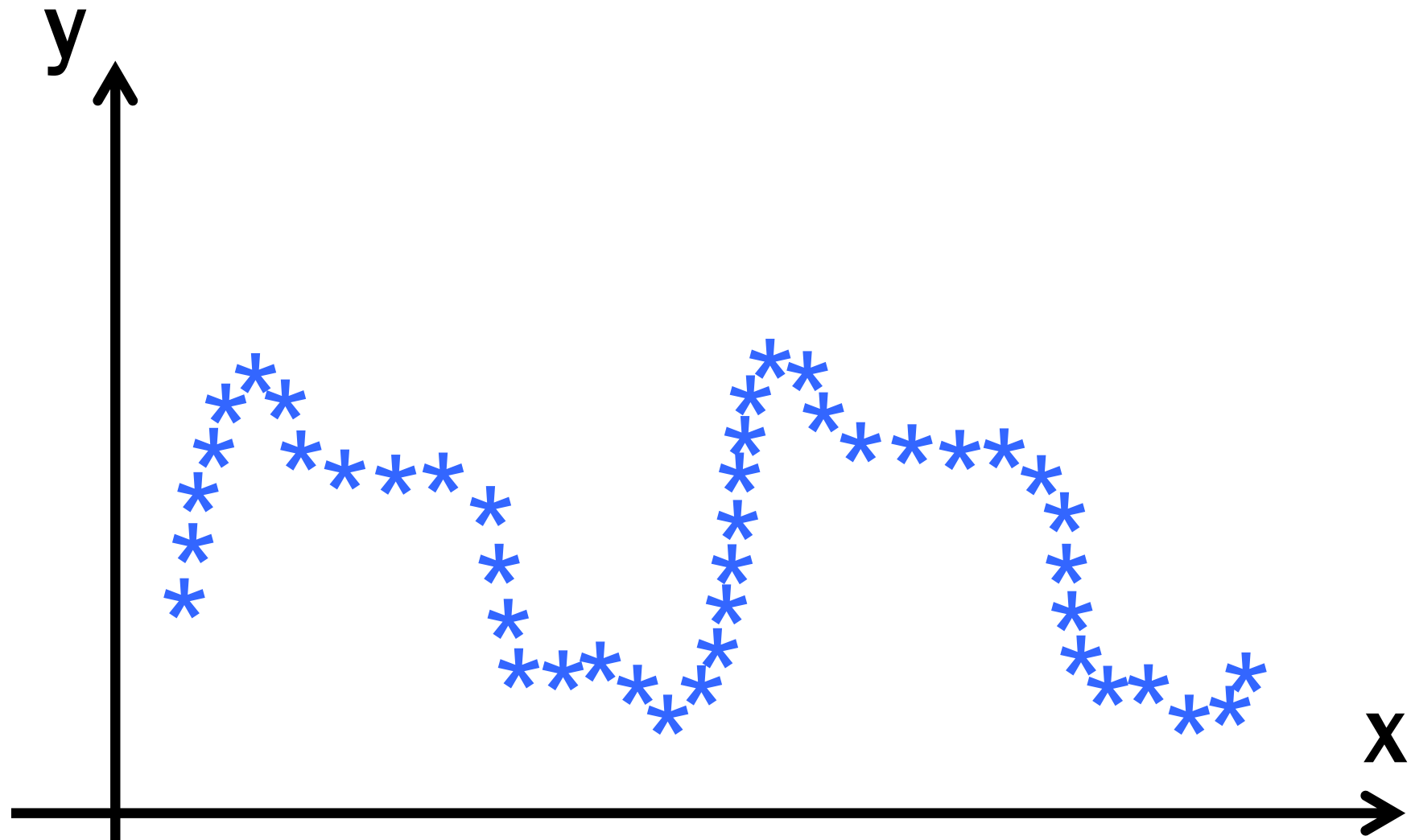


**SAMPLING**

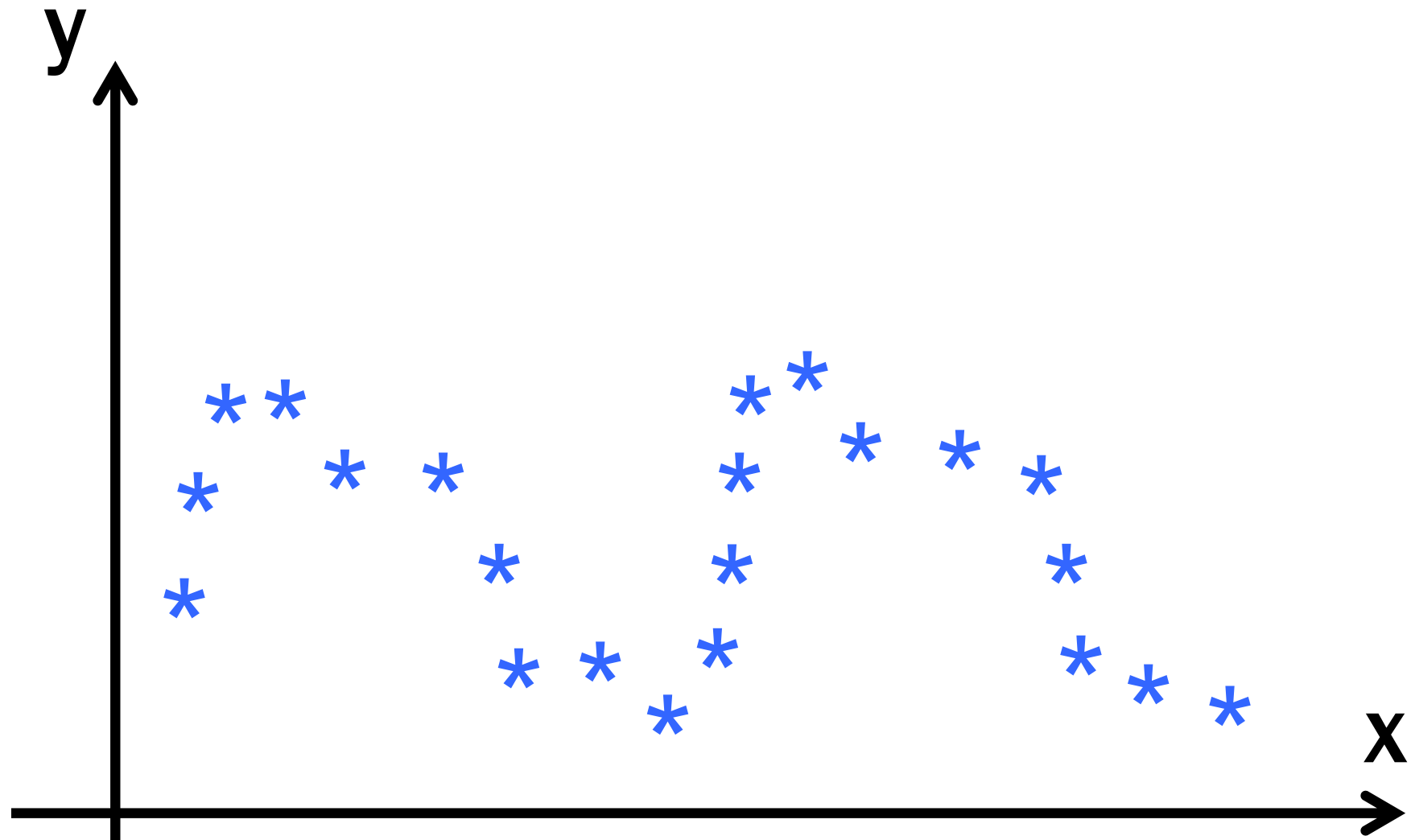


# SAMPLING

- We pick a point on the wave to compute coordinates for only every interval of time
- Each picked point is called a SAMPLE
- The number of samples per unit of time is called SAMPLING RATE
- The higher the sampling rate, the more samples we have
- The more samples we have, the better the numerical description of the wave is

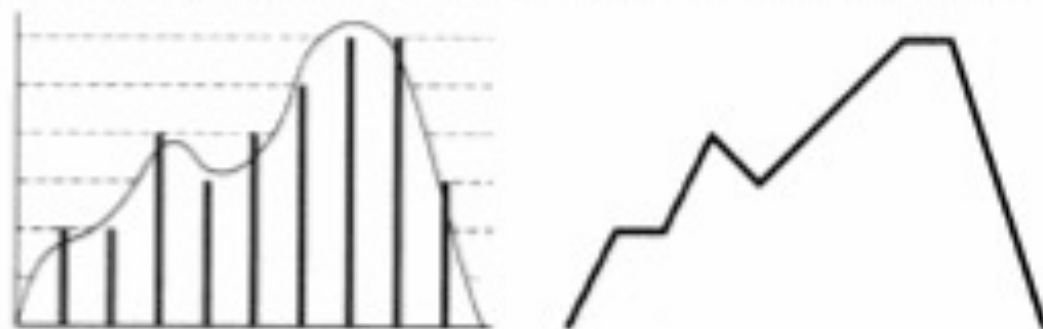


**MANY SAMPLES**

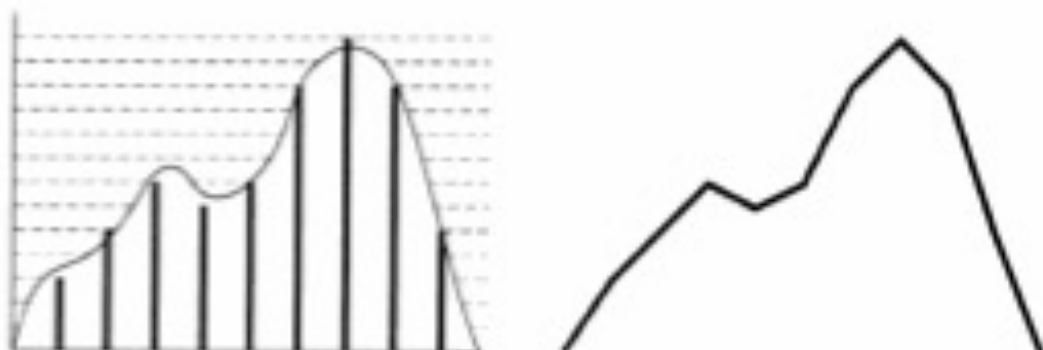


**HALF SAMPLES**

**Figure 20 - Effect of Increased Resolution and Sampling Rates**



Low Resolution and Sampling Rate



Increased Resolution



Increased Resolution and Sampling Rate



# SAMPLING

- We pick a point on the wave to compute coordinates for only every interval of time
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# SAMPLING

numerical description

(1, 23) (2, 30) (3, 28)  
(4, 30) (5, 29) (6, 35)  
(7, 37) (8, 22) (9, 18)  
(10, 13) (11, 8) (12,  
2) (13, 4) (14, 8) (15,  
10) (16, 18) (17,  
20)...

# DIGITAL IMAGES: MONITORS





DIGITAL SOUNDS: ?

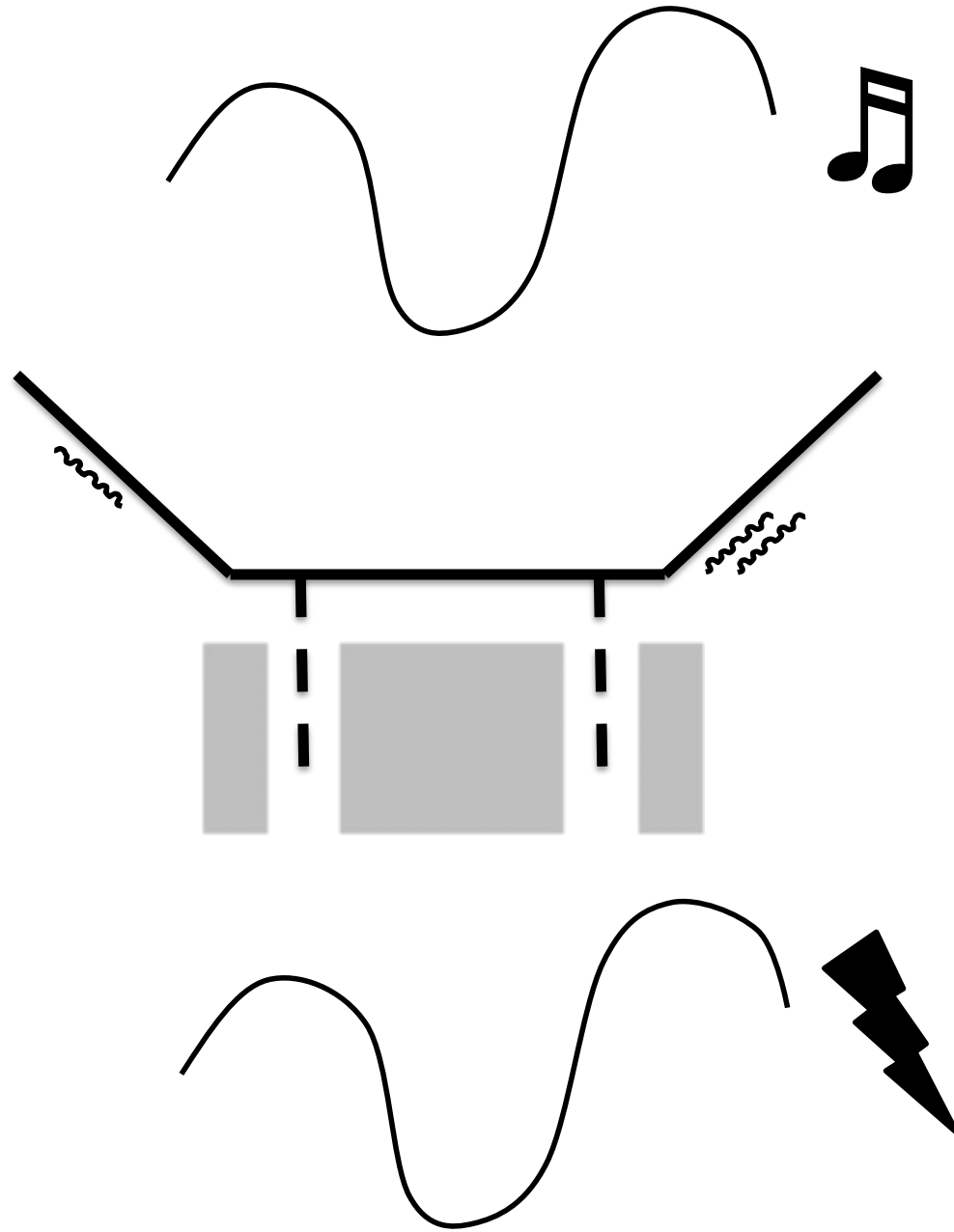
# DIGITAL SOUNDS: LOUDSPEAKERS

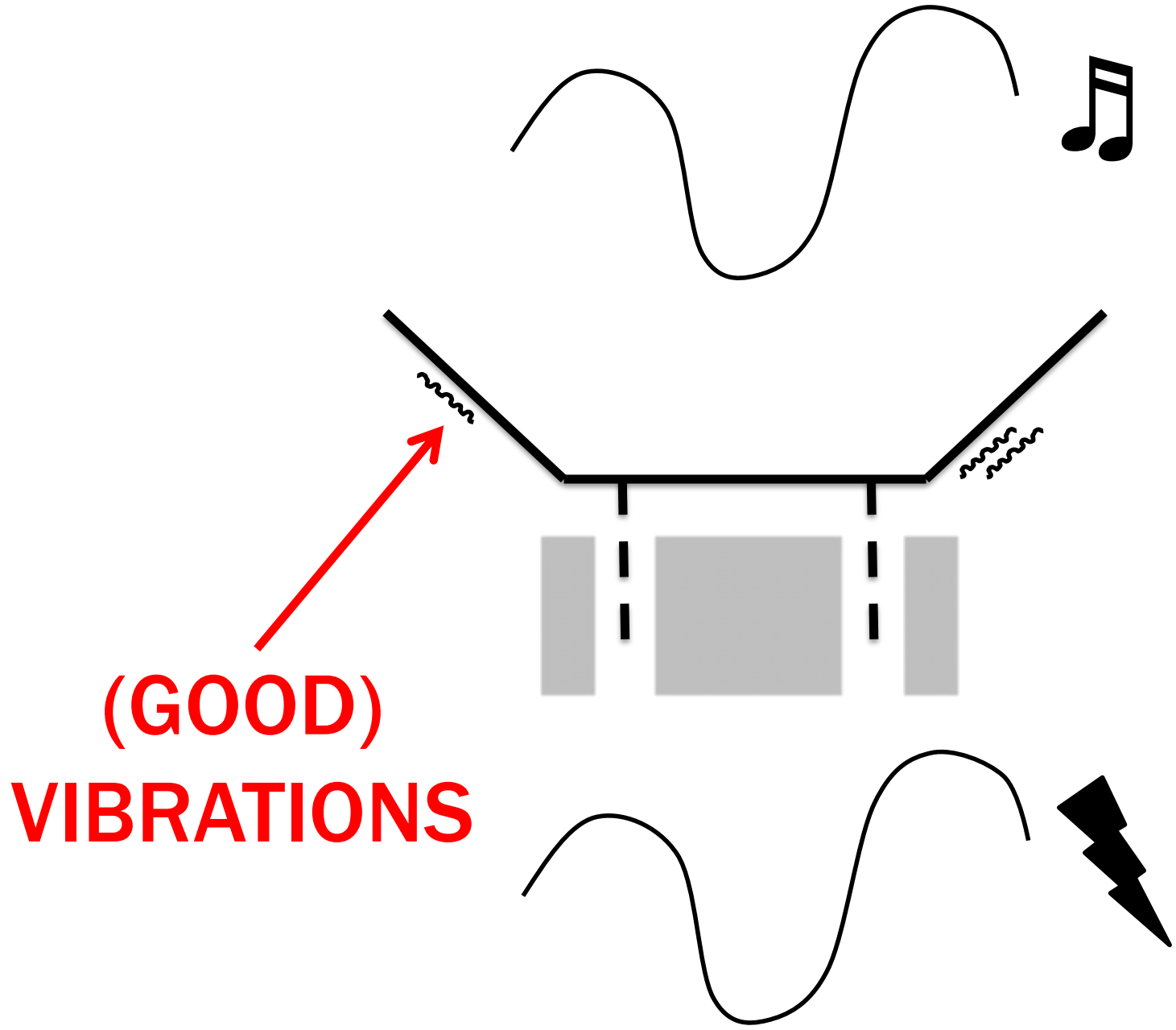


# THE NEED FOR HARDWARE

- As it always happens, digital technology needs physical tools that convert numbers into physical phenomena

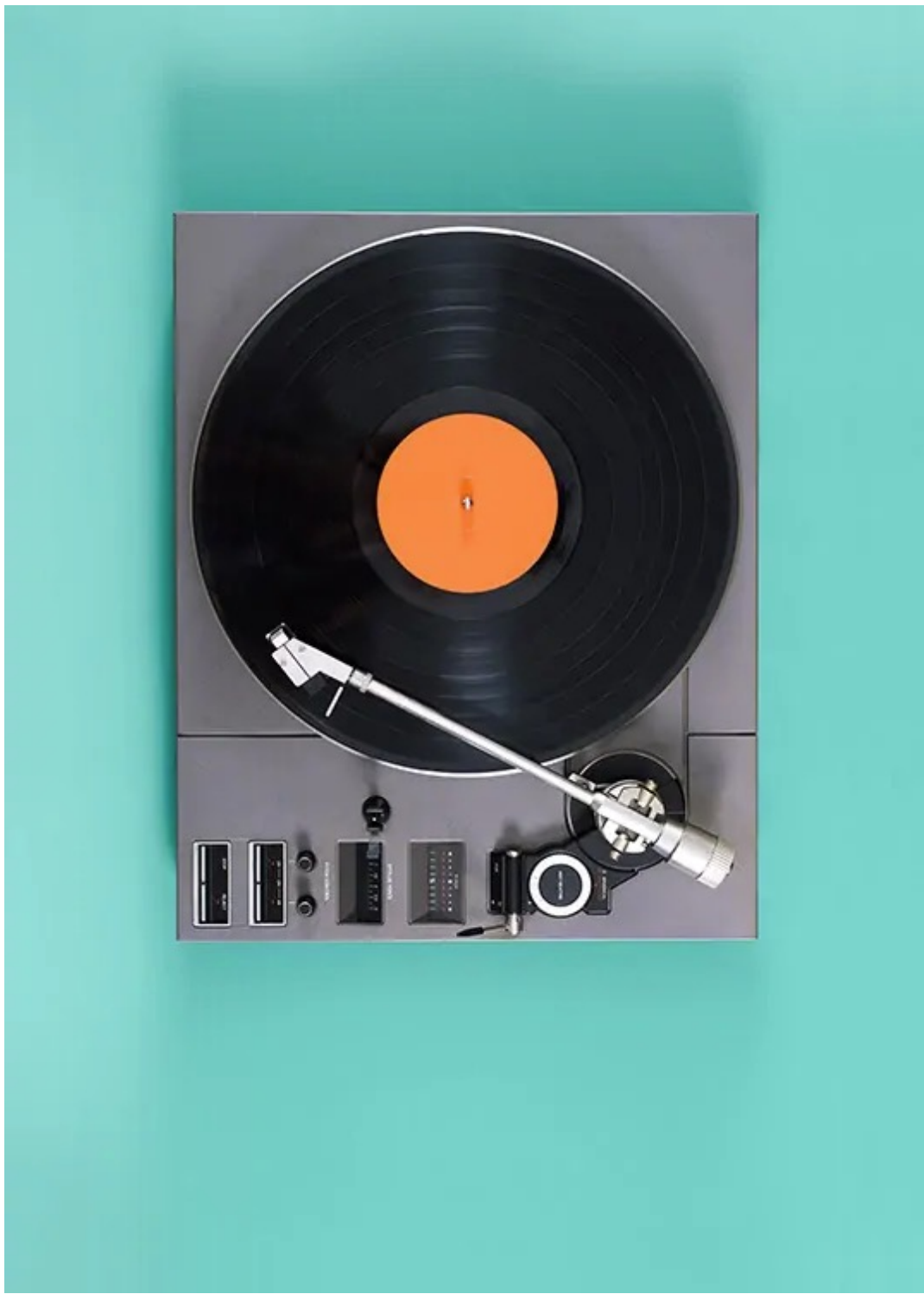


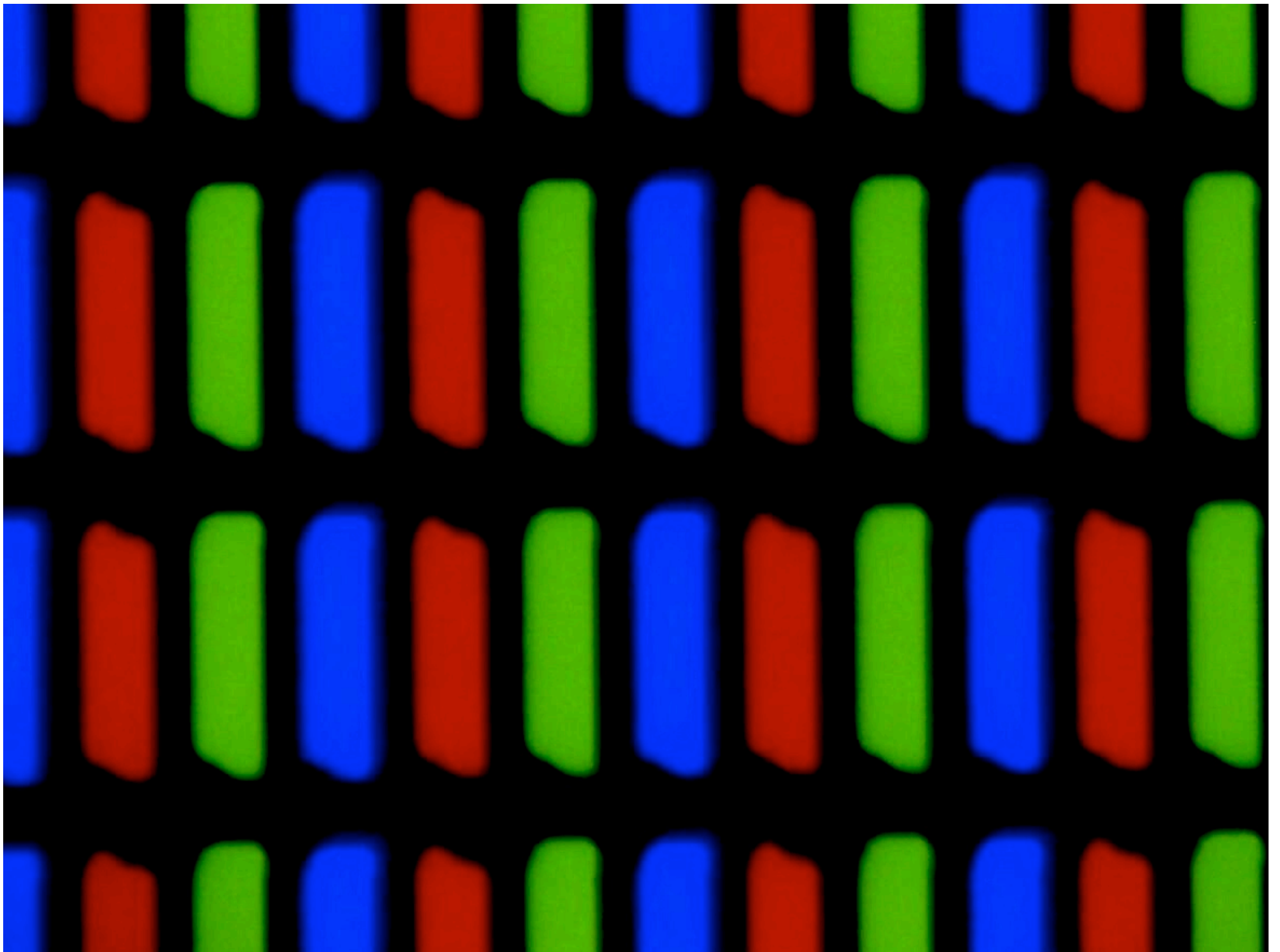


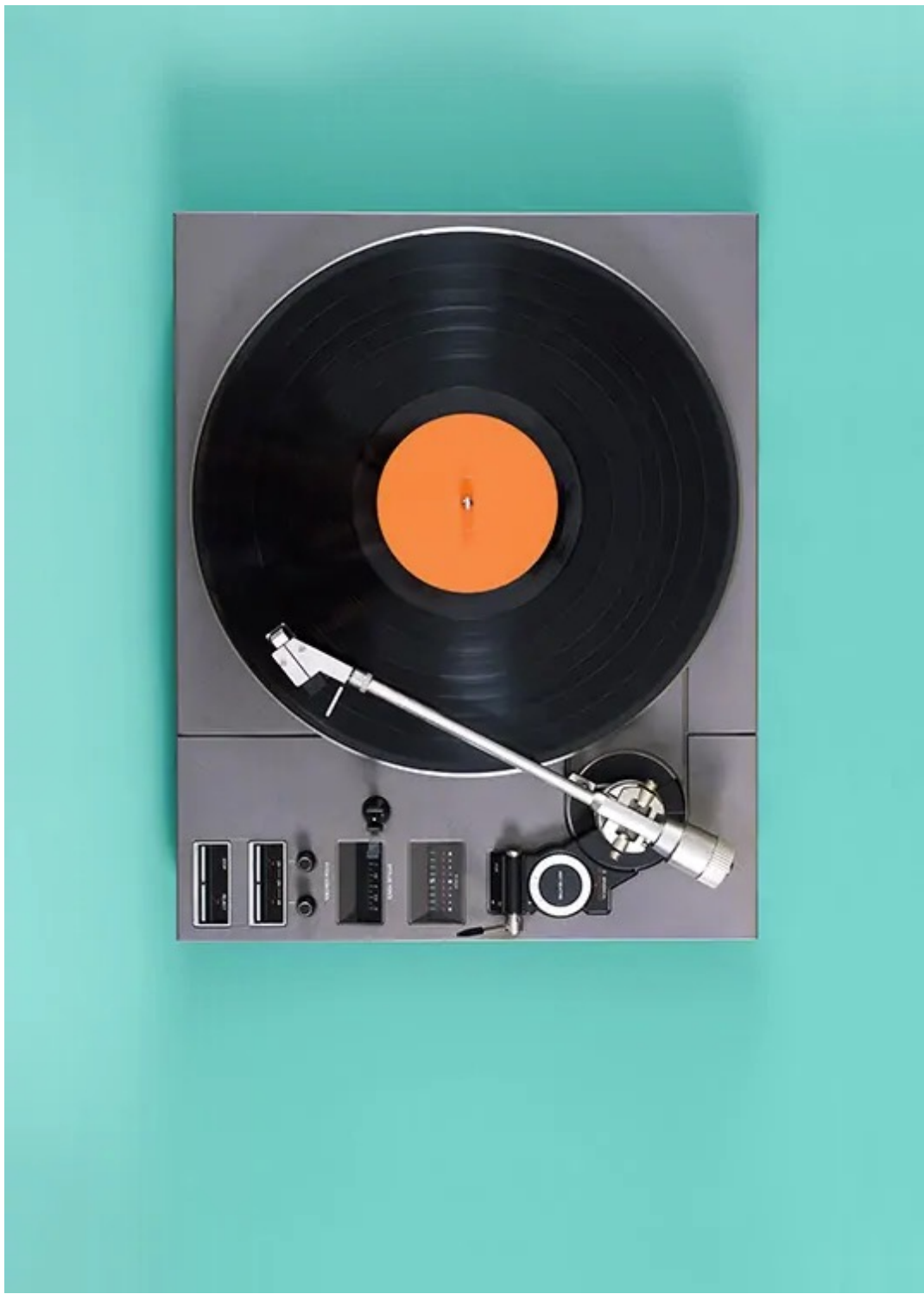


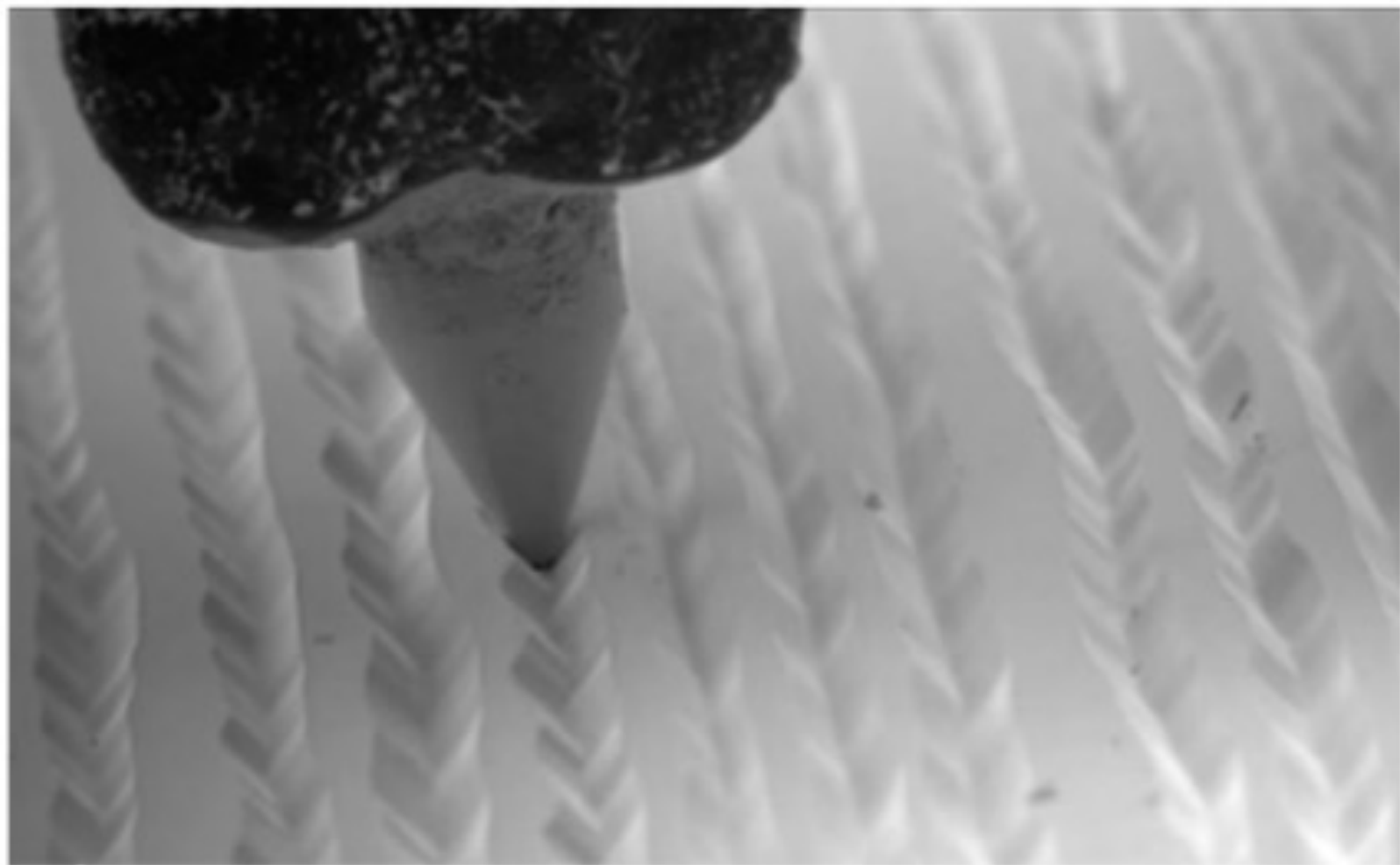
**(GOOD)  
VIBRATIONS**

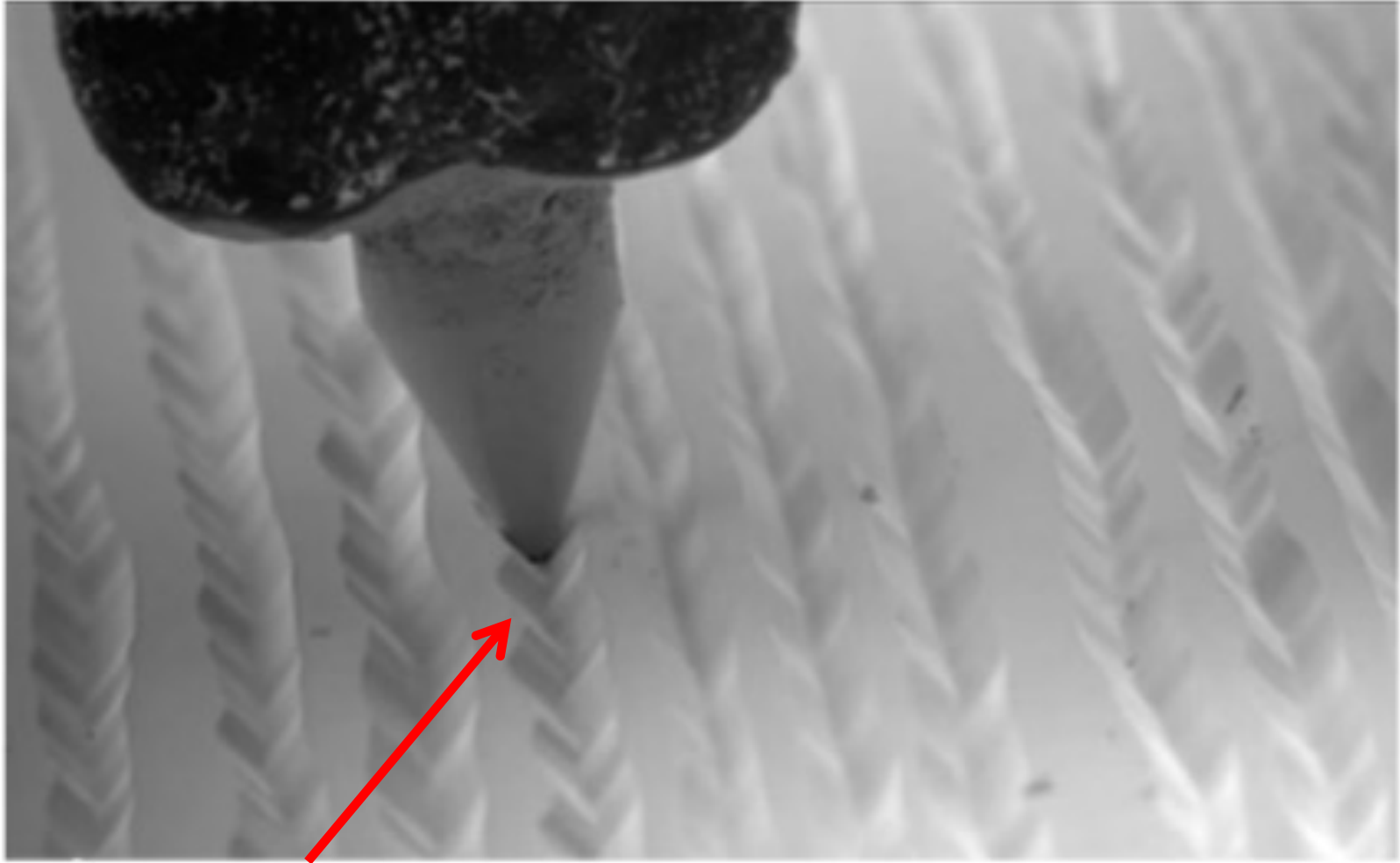






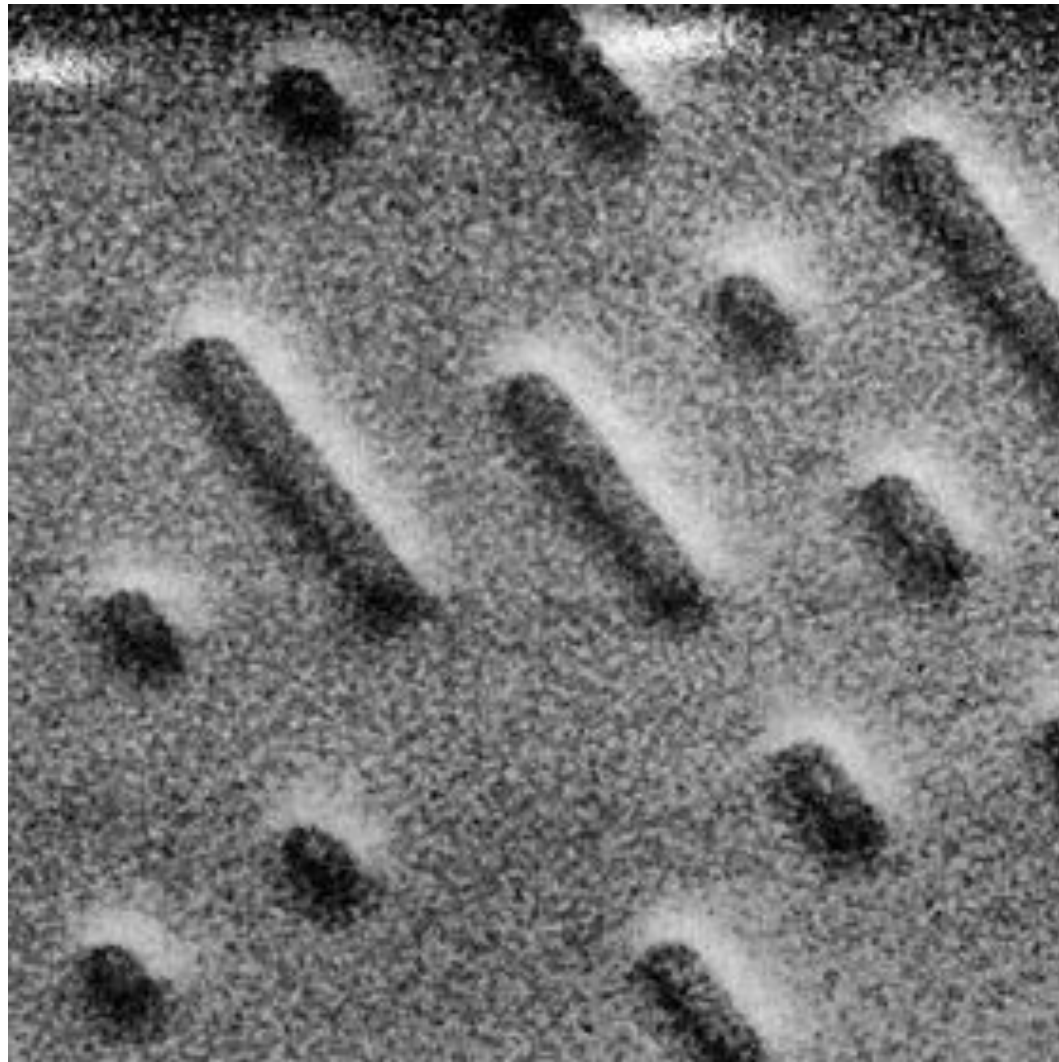


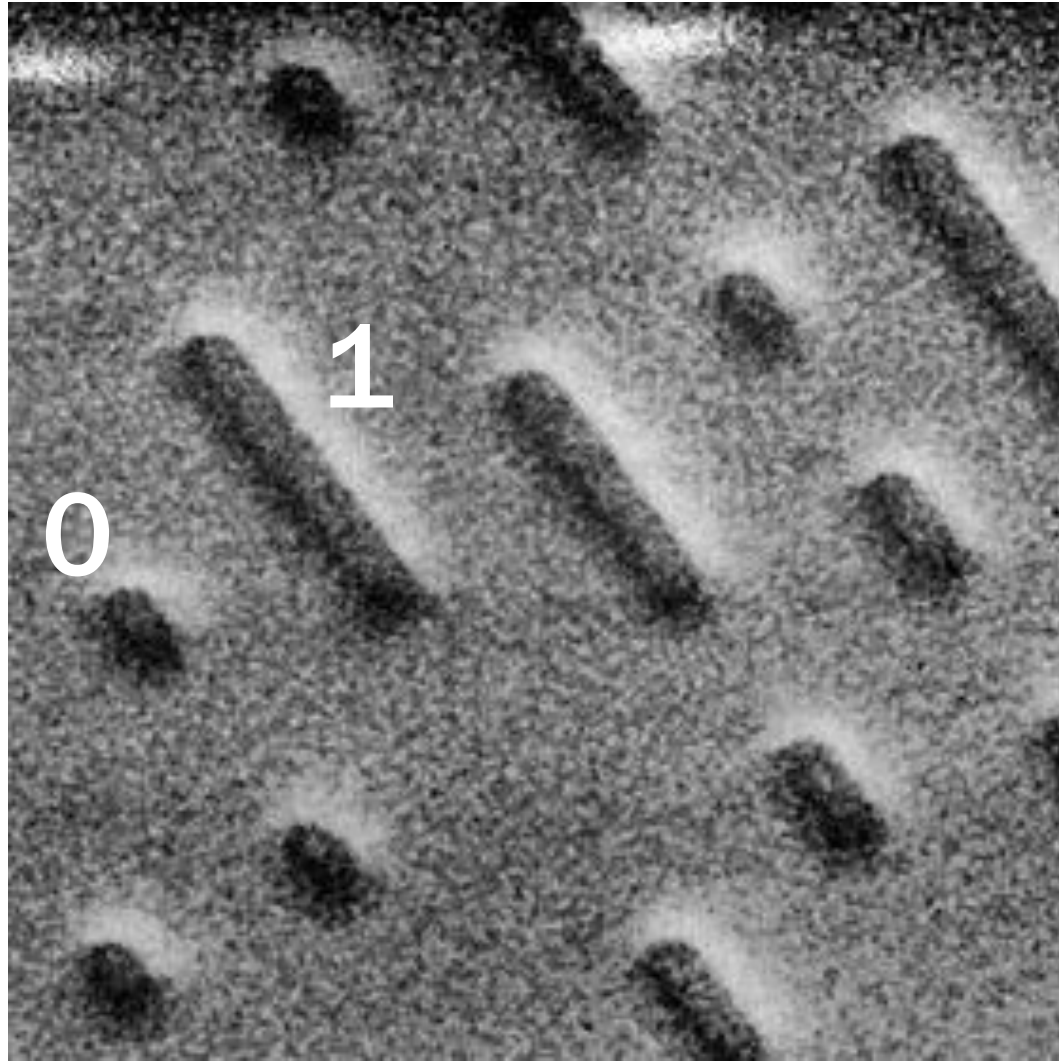














MUSIC IS A PROOF THAT  
THERE IS NO REAL DIVIDE  
BETWEEN ANALOG  
AND DIGITAL TECHNOLOGY

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