Jérôme Carette | De l'autre côté de l'école | Brussels | Belgium
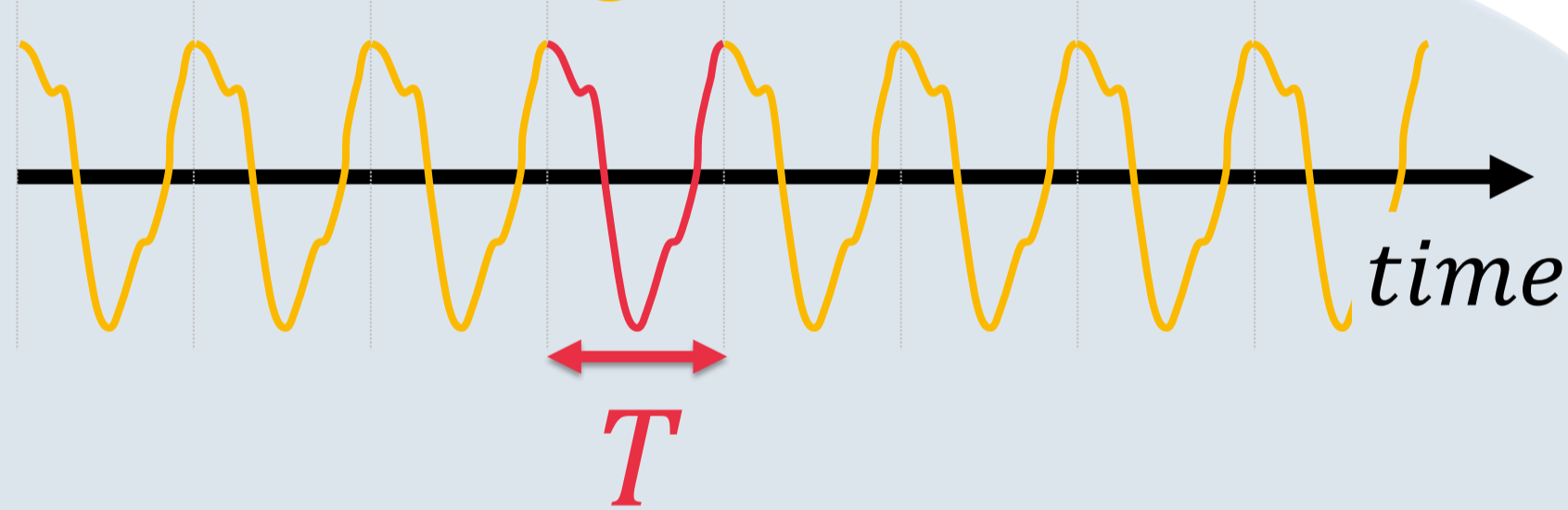
The physics of musical instruments
A waves perspective of the musical timbre
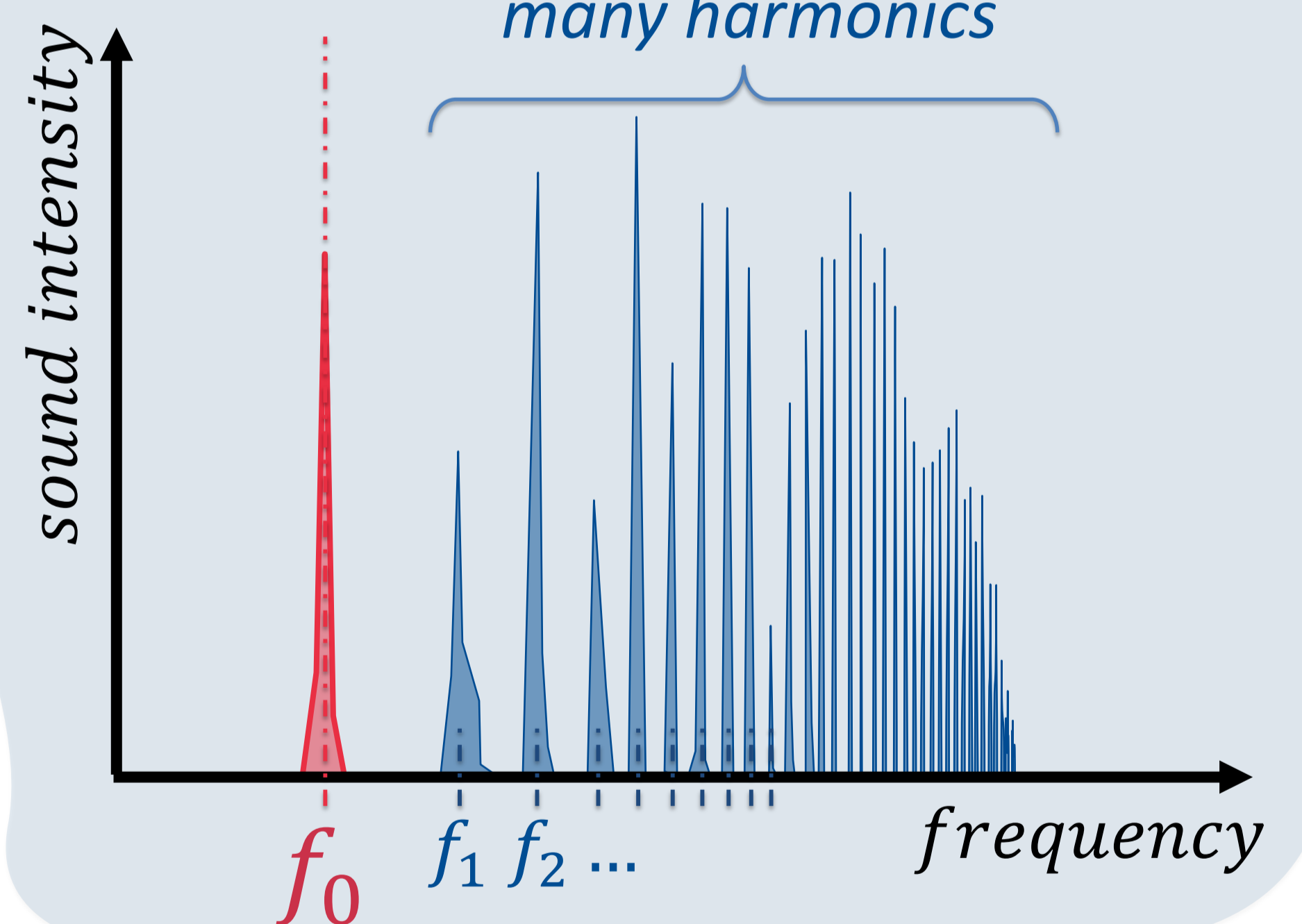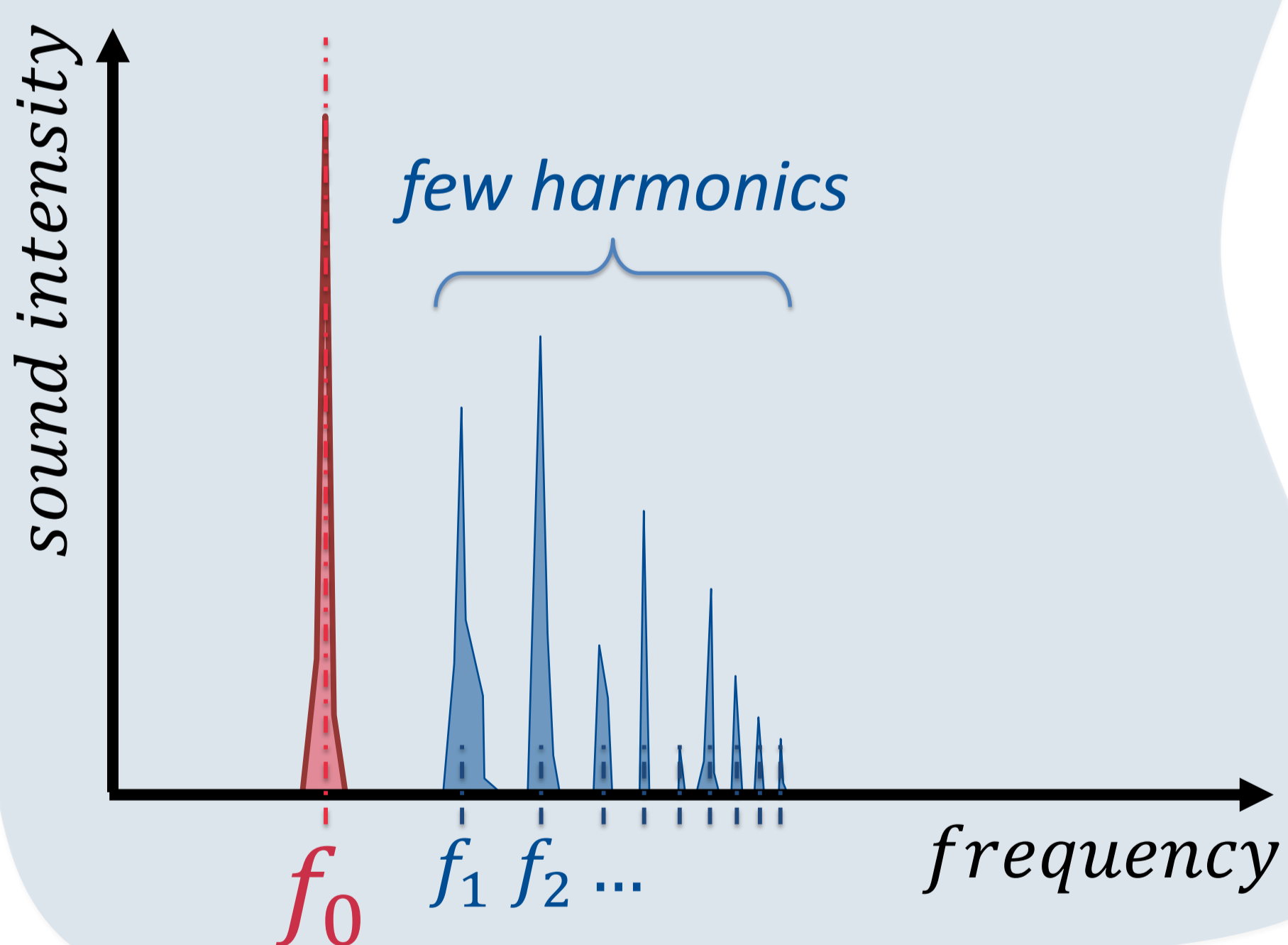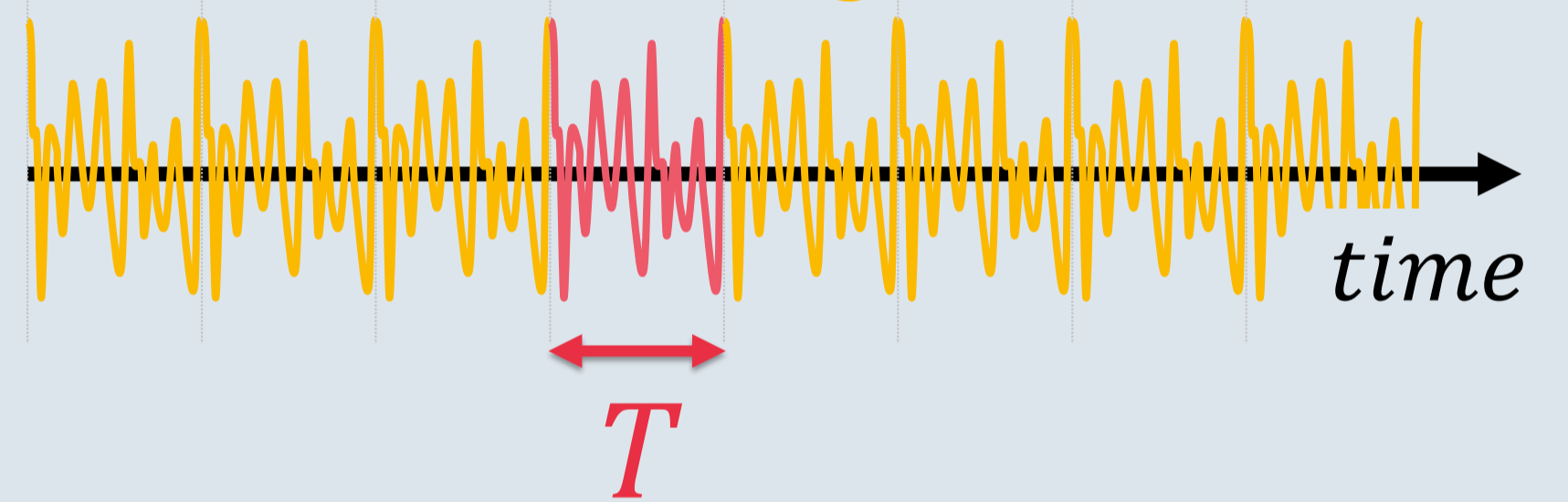
Two different instruments playing the exact same note (A_4 – 440 Hz)

Flute recording

time

T

sound intensity

few harmonics

f_0 f_1 f_2 ...   *frequency*

Harmonica recording

time

T

sound intensity

many harmonics

f_0 f_1 f_2 ...   *frequency*

Same **fundamental frequency** f_0 = same **note** heard

Different **harmonics** f_n = musical **timber** of the instrument

Physical laws can describe the nature of sound

$$T = \frac{1}{f_0} \qquad f_n = f_0 \cdot (1 + n)$$