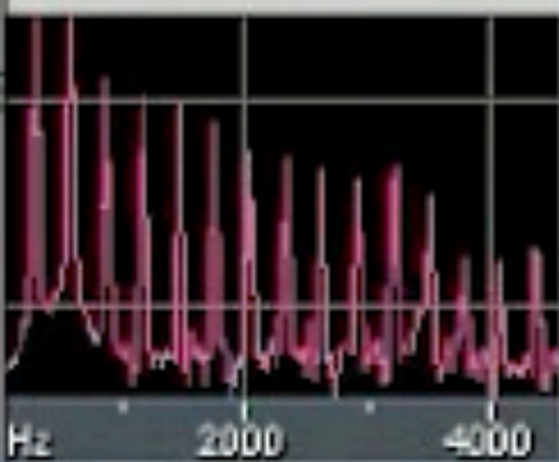
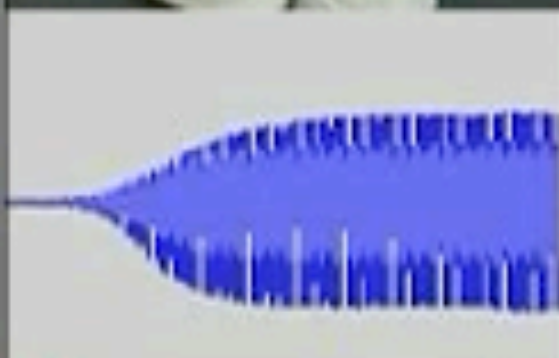


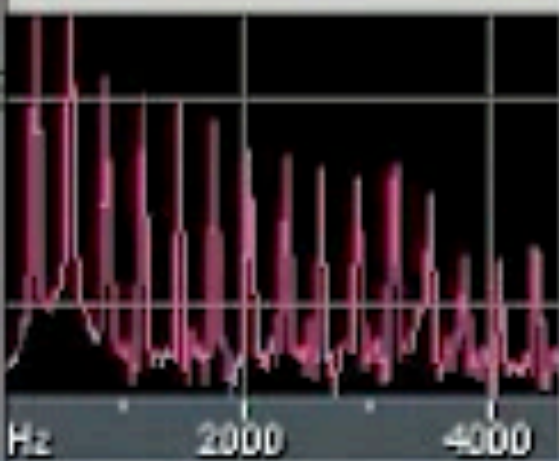
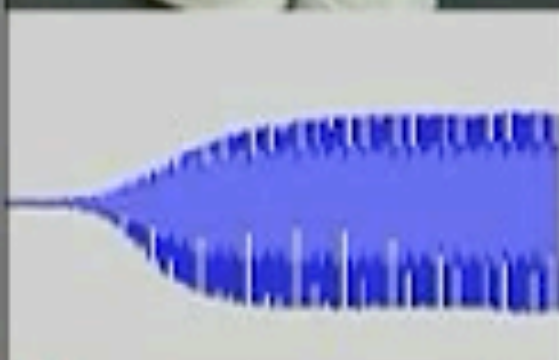
Timbre (also known as tone color/quality)

Depends strongly on *development* and also on spectrum

2

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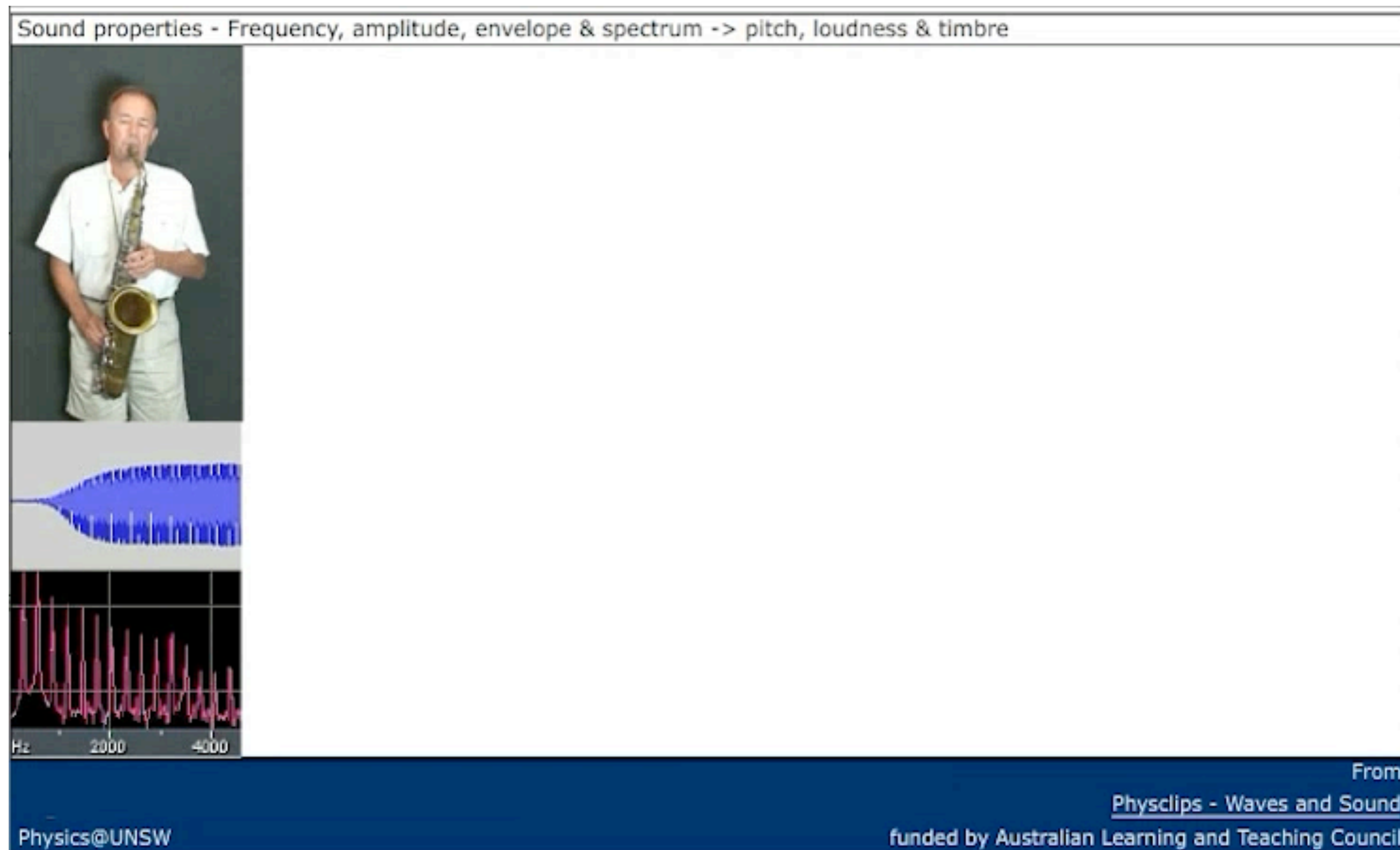




Hz 2000 4000

Timbre (also known as tone color/quality)

- Depends strongly on *envelope (time variation)* and also depends on *spectrum*



Timbre: Spectrum and harmonics

- ▶ A periodic wave has a harmonic spectrum
 - Spectrum includes both magnitude of the harmonics and not their relative phases
 - Our ears are not very sensitive to relative phase
- ▶ Harmonic series: a set of frequencies f , $2f$, $3f$, $4f$, f is the fundamental frequency

