

Animations from

The influence of mouthpiece cup shape on “brassiness”

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This PDF file contains the two animations from my talk **The influence of mouthpiece cup shape on “brassiness”**, given at ViennaTalk2010.

The animations can be viewed with Adobe Acrobat Reader, but not with Preview, the standard PDF viewer for Macintosh OS X. I do not know about PDF viewers for Linux.

If the animation does not display properly, try running Acrobat Reader in full-screen mode. Use the ESC key to exit full-screen mode when finished.

An animation is started by left-clicking when the mouse cursor is within the graphic area. (The cursor will change shape when it crosses the boundary into or out of the graphic area.) To proceed to the next slide, one must move the cursor outside the graphic area and left-click to “escape” from the animation. In full-screen mode, this also brings up the next slide. If not in full-screen mode, one must go to the next slide in any of the usual ways (down or right arrow key, space bar, return). An animation may be replayed by left-clicking or pressing return while the cursor remains within the graphic area.

The first animation shows the distortion of one cycle of a sine wave as it propagates to twice the shock-formation distance. After the shock wave forms, the shock is shown in red.

Beyond the shock-formation distance, the waveform soon assumes a sawtooth shape that changes relatively little thereafter.

The second animation shows the evolution of the spectrum as the initially-sinusoidal wave propagates. The dots showing the amplitude of the harmonics change color from blue to red after the shock has formed.

In this simplified model, energy is conserved before the shock forms. Note that the level of the fundamental (harmonic 1) falls even before the shock forms as energy is transferred from it to the higher harmonics by the distortion of the waveform.

After the waveform has settled into the sawtooth shape, its spectrum is also stable. However, the shock wave consumes energy, causing the entire spectrum to continue dropping in level.

