

Sample solution for the tutorial: Spectral display with Sonic Visualiser

https://analyse.hfm-weimar.de/doku.php?id=en:tutorium_spektral

Aphex Twin: *Bucephalus Bouncing Ball* (selection)

How does the accuracy of the spectrum change with different window sizes? Pay particular attention to the low frequency range.

The smaller the window size, the more diffuse the low frequency range is displayed; in an extreme case only a long straight line can be seen (e.g., with a window size of 512 samples only up to just below 100 Hz). If the window size is larger, there are increasingly jagged lines in the low frequency range, which allow a differentiated assessment of the frequency components there.

Now move the transport window (under the waveform) with the cursor to the right or left. How does the displayed spectrum change?

Depending on how fast the transport window is moved, the line of the spectrum "jitters" to different degrees. If it is shifted very slowly, sometimes certain mountains or peaks appear that seem to be fixed for a while (e.g. second 15.0 to 15.4). This is an indication for frequency components (fundamental and harmonics) that sound unchanged for some time.

At certain times the whole curve lifts completely, the peaks blur. These are the regularly sounding percussive impulses. From about 0:28 on, these peaks become rarer overall - as the sounds are now very percussive.

How can the start of the track be characterized in terms of rhythm? What happens from 0:28 on?

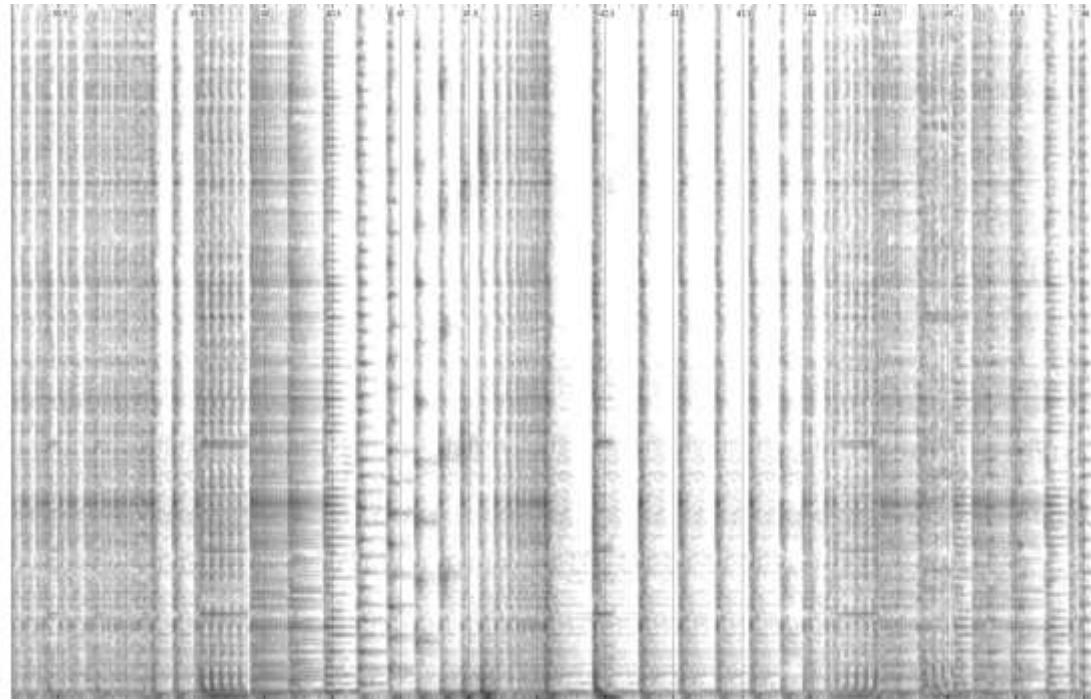
After a quiet introduction with only a few percussive impulses, a complex rhythmic structure begins at 0:23. From 0:28 on, chains of impulses sound, with increasingly shorter intervals in between, which creates the impression of an acceleration.

Look for tones in the spectrogram! Where do you find horizontal lines? How do the corresponding passages sound?

Horizontal lines can be found in the first part until 0:28. They refer to the synthesizer sounds heard in this section. In the percussive passage that follows, similar longer horizontal lines are absent.

Listen to the short passage 0:40-42. Here the sound of a percussive sound changes very quickly. What can be learned about the sound character from the spectrogram?

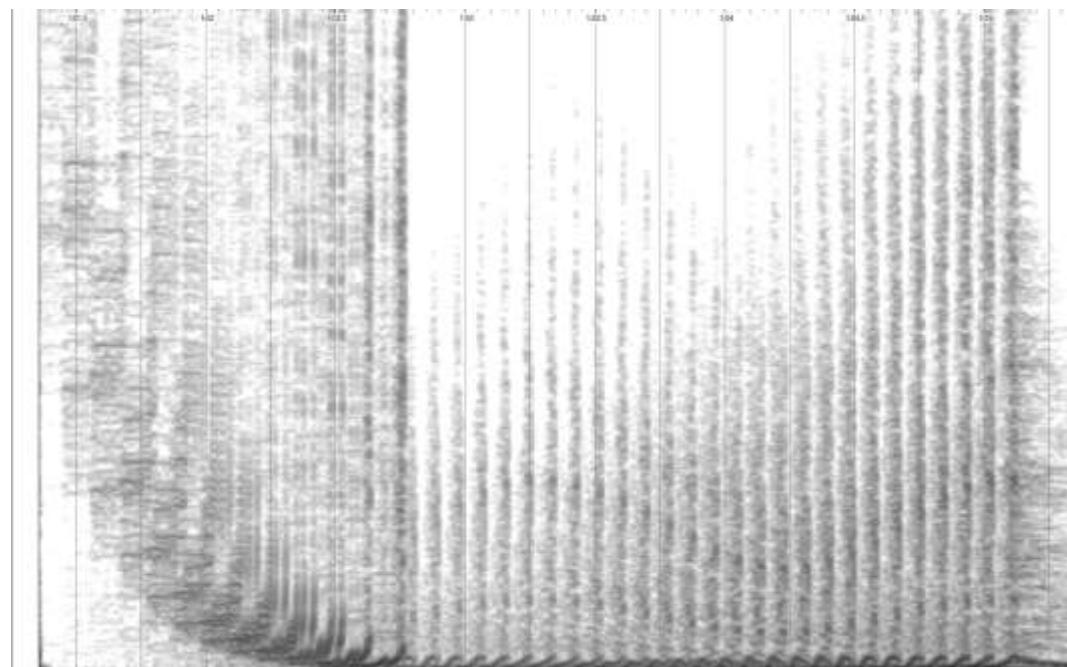
In this passage, each individual sound event sounds different, and certain pitches can be discerned despite the percussive character of the sounds. Short parallel lines are recognizable in the spectrogram, the position and number of lines change from sound to sound (similar from 0:45).



Spectrogram 0:38 - 0:46, 10 Hz to 10 kHz, window size 4096 samples

Now consider the passage 1:01-05. What can be concluded from the visual representation about the tonal character of the passage?

The sound impression is difficult to describe: At first, a sound glides with descending pitch that is "rippled" or "staggered". Afterwards, short impulses can be heard whose sound changes fluidly in the frequency spectrum - the strength of the gray coloration in the middle frequency range changes accordingly.



Spectrogram 1:01 - 1:05, 10 Hz to 10 kHz, window size 4096 samples