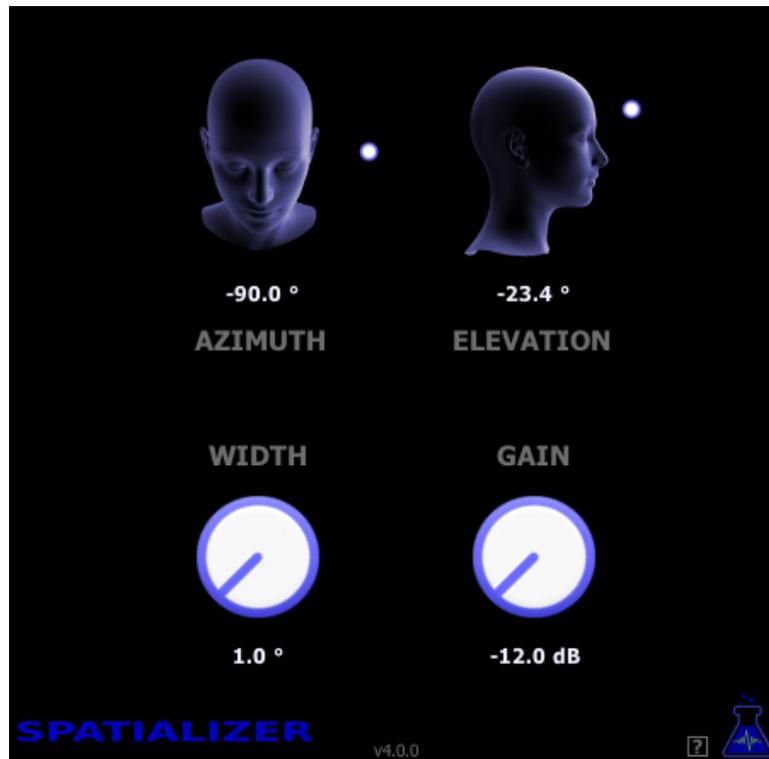


SPATIALIZER



DESCRIPTION

Spatializer is a binaural spatialization plugin, namely it processes sounds to give the feeling to the listener that these sounds come from a particular direction. It sets somehow the position of a sound source in space.



This is more than just a simple pan processing, firstly because the feeling of location is rendered all around the head (in front, behind, several heights...). Secondly, the sound rendering takes the shape of the human ear into account and the sound is “equalized” consequently.

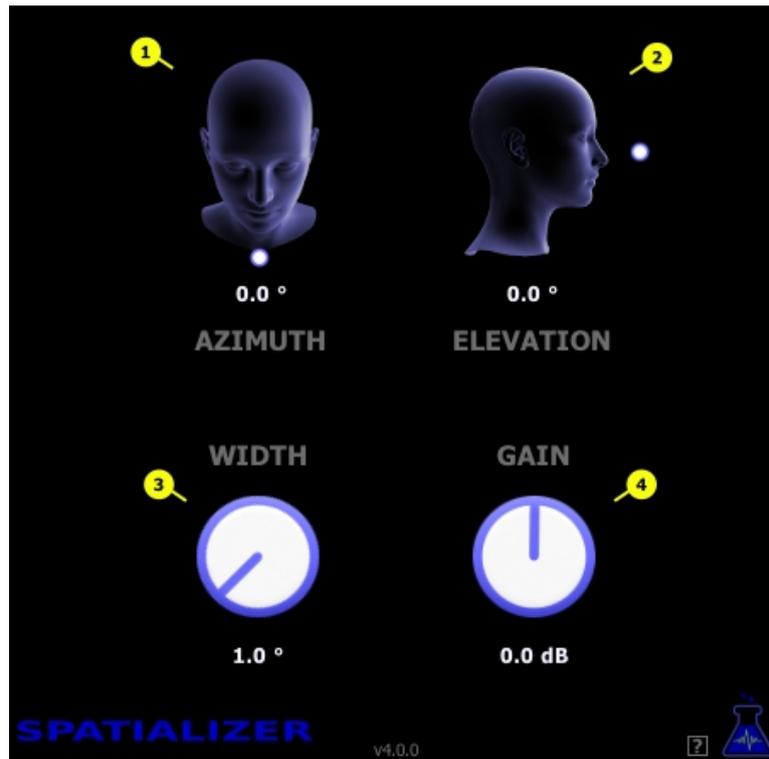
The processing done by the **Spatializer** plugin is planned to be listened using headphones. When listening with speakers, the result can be interesting but it is not intended to be used this way.

PRINCIPLE

The **Spatializer** plugin uses the HRTF (“head-related transfer function”) whose measurement and processing are describes in the article cited in reference.

The HTRF dataset used is the response of each of the two ears depending on the direction of the incoming sound. From this dataset, any sound can be processed to give the feeling that the sound comes from a particular direction.

USAGE



The **AZIMUTH (1)** and **ELEVATION (2)** parameters define the position of the sound source around the head (the source is represented by a white dot).

The **AZIMUTH (1)** parameter defines the position of the sound source in the horizontal plane (in front, on the right, behind, on the left, and all the intermediate positions).

The **ELEVATION (2)** parameter defines the position of the sound source in the vertical plane (under, in front, over, and all the intermediate positions).

When combined, these two parameters **AZIMUTH (1)** and **ELEVATION (2)** enable the possibility to set the sound source anywhere around the head.

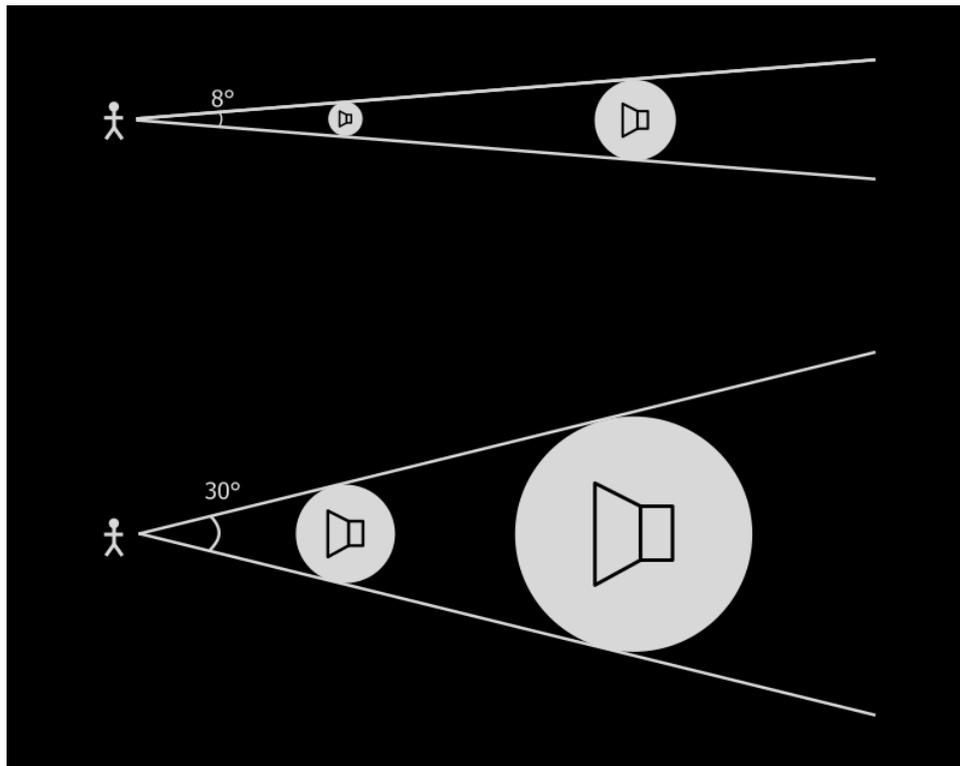
Note : The **Spatializer** plugin is designed to process a track with stereo output. The input of the track can be mono, but the output must be stereo after having inserted the plugin. On some DAWs, the track must be created as a stereo track before inserting the plugin.

Note: The **ELEVATION (2)** parameter is bounded at 40° down. Above this value the sound couldn't have come from within the body !

Note: When the **ELEVATION (2)** parameter is exactly at a value of -90°, namely just over the head, the **AZIMUTH (1)** parameter has no effect anymore (the sound source would turn on itself).

The **WIDTH (3)** parameter defines the "width" of the sound source. To render the feeling of width, the **Spatializer** plugin uses a simple model.

The width is defined as an angle which increases either when the real width of the source increases, or when a source with a constant width gets closer to the listener.



**Sound source width – WIDTH(3) set at 8° and 30°
A small and close source is similar to a big and far source**

If the **WIDTH (3)** parameter is set to a small value, the source appears as a point source or as a far source. If the **WIDTH (3)** parameter is set to a big value, the source appears as a large source or as a close source.

The plugin uses internally the value of the **WIDTH (3)** parameter to compute a phase difference at the arrival of the sound at each ear. The computation uses the direction and the width of the source, as well as the distance between the source and the head.

The **GAIN (4)** parameter modifies the output gain.

EXAMPLES OF USE

We want to give the feeling that a sound comes from a given direction.

We want to give the feeling that a sound moves around the head. For this purpose, some automations can be used on the **AZIMUTH (1)** and **ELEVATION (2)** parameters.

FAQ

The level of the sound seems to decrease abnormally when the source goes to the right side

This means that the track used is not a stereo track. The **Spatializer** plugin needs a track that has a stereo output, to be able to output a different sound for each of the two ears. With most DAWs, the track is automatically converted to a stereo track when the plugin is inserted. But with some other DAWs, the plugin will have to be inserted on a track that was initially created as a stereo track.

HRTF used:

<http://sound.media.mit.edu/resources/KEMAR.html>
"HRTF Measurements of a KEMAR Dummy-Head Microphone"
Bill Gardner and Keith Martin