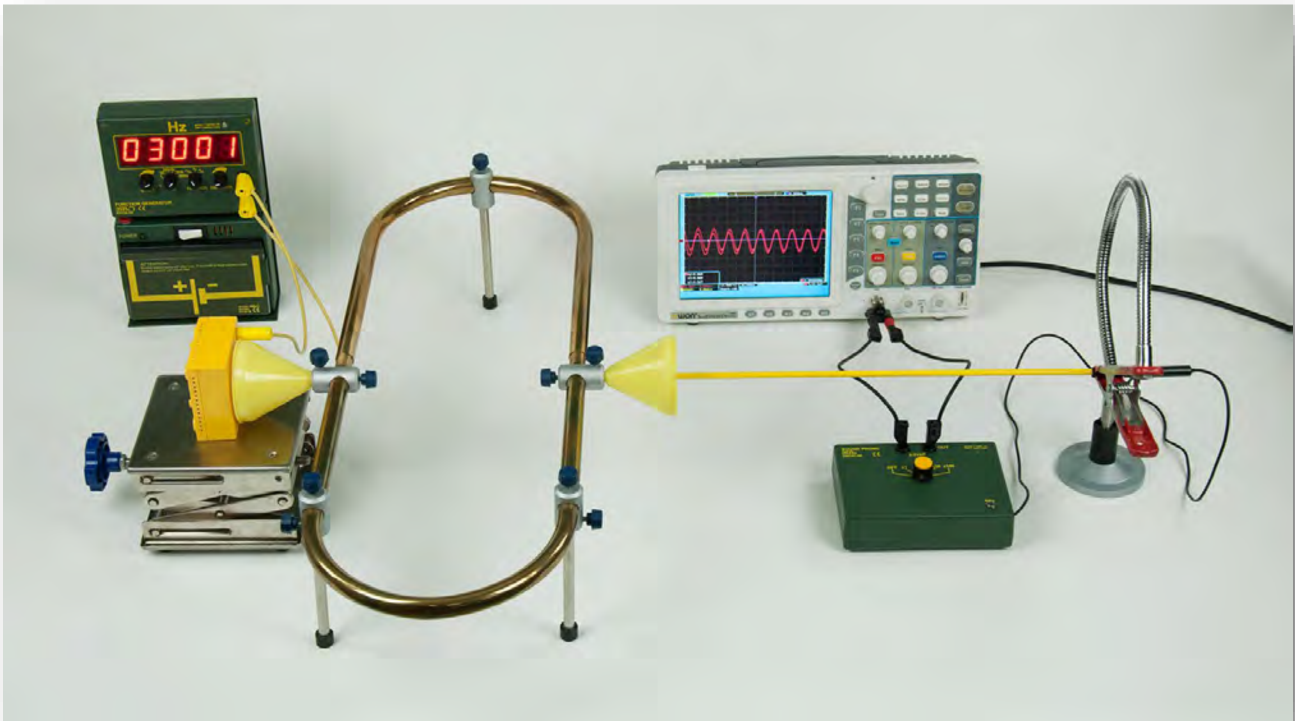
QUINCKE'S INTERFERENCE TUBE

AKD 04.04



Material:

Item Code	Qty	Description
KDW355-1Q	1	Interferenzrohr nach Quincke
DE751-3A	1	Oscilloscope, two-channel, 30 MHz, with VGA
DW340-2M	1	Measuring microphone "inno"
P3120-4A	1	L-shaped assembly platform
P3120-1G	1	Function generator with digital display "inno"
P3120-1B	1	Rechargeable battery, "inno", 6V/10 Ah
C7235-2B	1	Lab-jack small, 150x150 mm
MB240-1LS	1	MBC Loudspeaker with nose
DS085-1R	1	Round base with stand tube, uni
C7007-1F	1	Flexible neck with metal clamp
	4	Connecting lead

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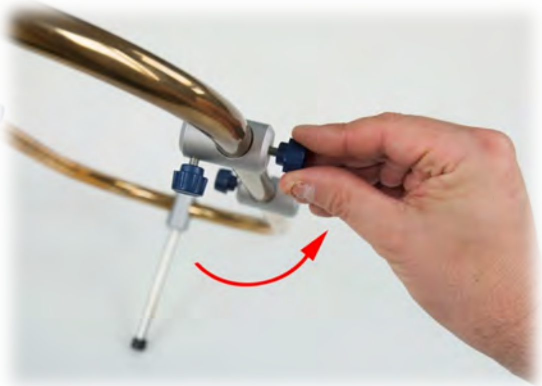
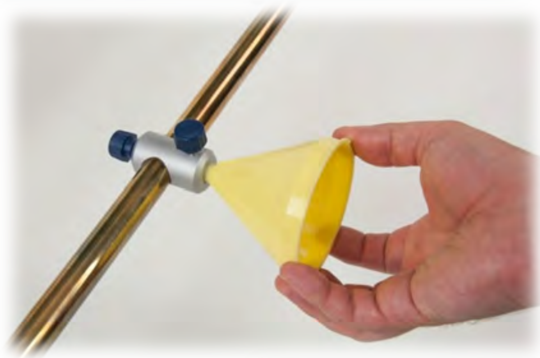
Setup:
The interference tube is set up.



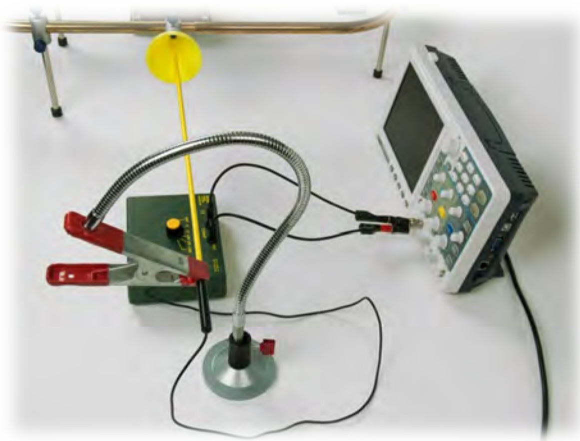
The bells are attached to both sides of the interference tube.



The loudspeaker is connected to the function generator and placed with the laboratory lifting table at one of the sound funnels.

The measuring microphone, which is connected to the oscilloscope, is held on the other bell. For this purpose, the clamp is plugged into the round base and the microphone is held with the clamp.

The microphone should be positioned as centrally as possible in the bell.



On the oscilloscope the measuring ranges of 50 mv and 200 µs are set. The amplification factor of the microphone is set to 10.

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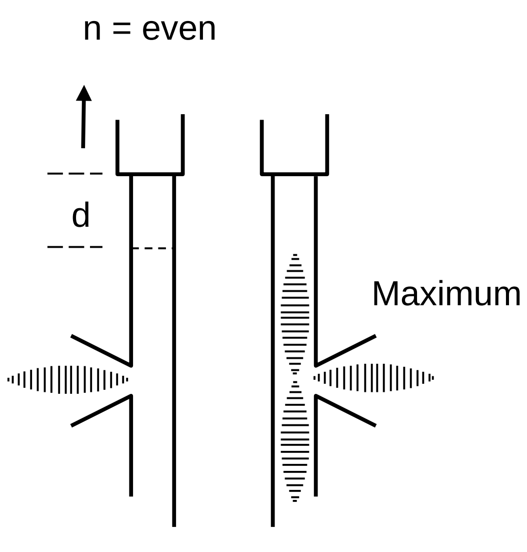
Experiment:
A frequency of 3000 Hz is set on the function generator. If the tubes are now moved, the volume can be varied at the other bell. The respective wavelength can be determined experimentally on the basis of the change in tube length.

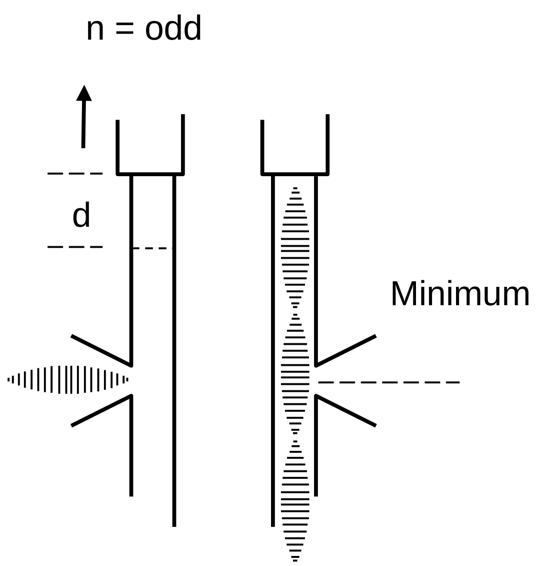
Measurement result:
At 3000 Hz, the volume minima occur at an extension of 2.3 cm in each case.

This means a total extension of 5.6 cm = 0.056 m. Since this corresponds to half the wavelength, this results in a λ of 0.112 m. At a speed of sound of 335 m/s (room temperature), this corresponds to a frequency of $335{:}\,0{,}112 = 2991\ Hz$.

Explanation:
The incoming sound waves are distributed between the two halves of the tube and meet again at the exit opening. For suitable path differences: 2d=n*λ/2, a standing wave is generated in the pipe sections. For even values of n, there is a wave belly in front of the exit opening, for odd values there is a wave node.



The node of the standing wave corresponds to a pressure maximum, the sound wave propagates into the outlet opening.



The belly of the standing wave corresponds to a pressure minimum, the sound wave does not propagate the outlet opening.