
Doppler Effect

The aim of this experiment is to verify the Doppler Effect and the determination of the Doppler shift in frequency of sound waves emitted/received by a moving source.

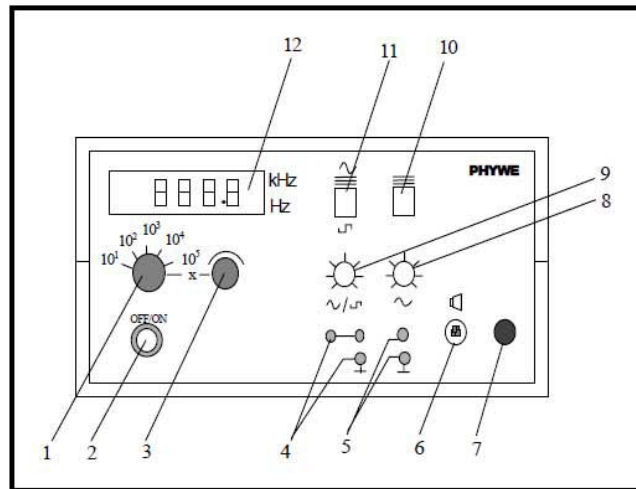
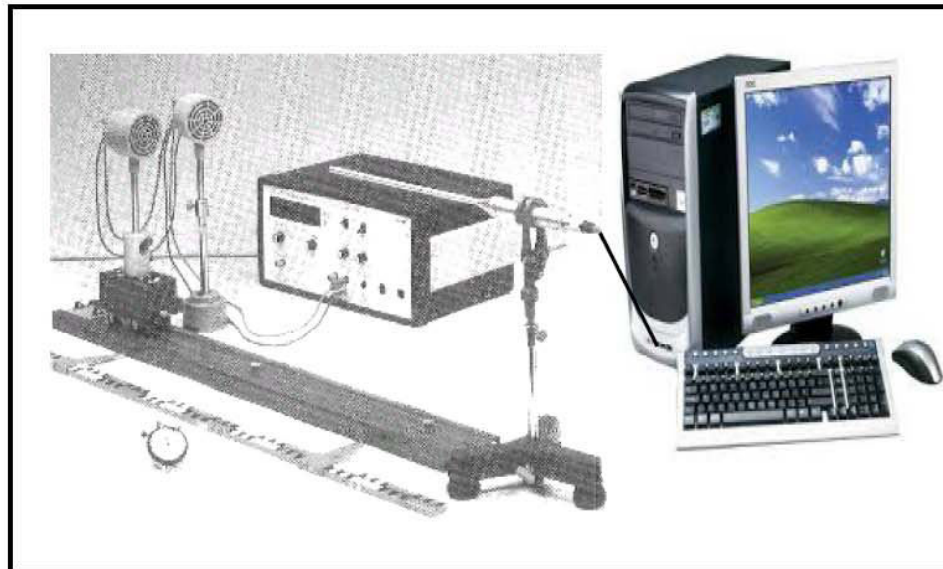


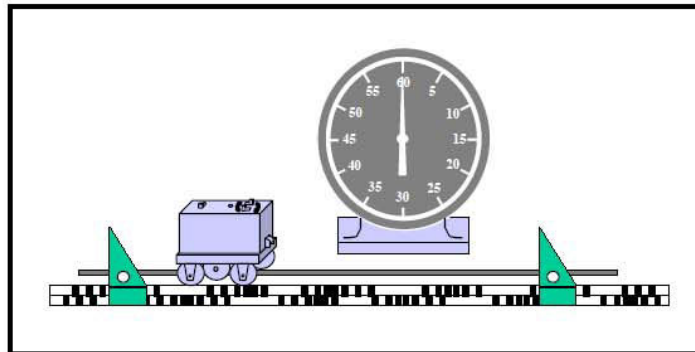
Figure of Power frequency generator.

$$\text{Equations } \Delta\nu = \nu - \nu_0 \cong \pm(V/c)\nu_0$$

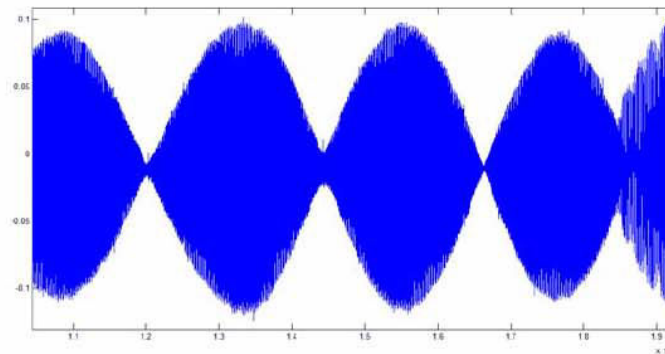
$$\text{Beat frequency } \Delta\nu = 2(V/c)\nu_0$$



Experimental Setup



Car Speed measurement



Beats plotted by Matlab software

Procedure

1. Open the recorder software from PC and adjust the sampling frequency as 48000 samples/second.
2. Record the sound wave while the car is fixed and save it on a “.wav” file to the computer.
3. Adjust and measure the velocity V of the motor driven Car,
4. Record the sound wave while the car is moving and save it on a “.wav” file to the computer.
5. Use the Matlab software to sum the two waves and obtain the Doppler frequency shift $\Delta\nu$.
As shown in figure ...
6. Calculate the velocity of the car from the Doppler frequency shift

RESULTS

Sampling frequency $F_s =$ s/s

The measured velocity of the car =

Doppler frequency shift $\Delta \nu = 2(V/c)\nu_0$

The calculated velocity of the car from Doppler frequency shift =

Error =