Doppler Effect in Circular Motion on an Angled Plane: Investigate How the Angle of the Plane of Rotation Influences the Shift in Frequency of a Wave Source

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This experiment is meant to understand the relationship between the plane of rotation of a sound/light emitting body in circular motion and the resultant shift in its frequency as per Doppler Effect. An equation is derived that accounts for the velocity of rotation of the body, the velocity of emitted waves, and the direction of recording instrument respective to the emitting body. The Experiment was conducted using a speaker stuck to a rotating blade. Measurements made from the velocity of the blade and the frequency of sound produced vs recorded by the microphone were used to inform the accuracy of the mathematical model. The model worked well, showing that a horizontal rotation plane with respect to the plane of the observing body, produced maximum frequency shift and a vertical one showed close to no shift. frequency. This research project will allow researchers studying binary stars to account for frequency shifts and thus produce more accurate models.

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