

# Radiometer

**What it teaches:** The radiometer is a means of showing the relation between heat and molecular activity of a gas in a visible way. It also shows that light is a form of energy and that it can be converted into other forms of energy.

**How it works:** Shining light causes the radiometer vanes to spin.

The radiometer consists of a rotating shaft with four vanes, sealed in glass container which has had over 99% of the air removed. The vanes are painted black on one side and silver on the other. In the presence of light with an infrared (heat) component, the remaining molecules inside the bulb begin to move faster. At the same time, the light is striking the surface of the vanes. The silver surface reflects much of this radiation, but the non-reflective black surface absorbs it and becomes warmer.

As the randomly-moving molecules strike the vanes from all sides, the ones striking the dark surface absorb some of this heat and bounce away with more kinetic energy. This results in a slightly greater "kick" being delivered to the dark side of the vane; the accumulation of thousands of these slightly greater "kicks" to the dark side of the vanes cause the vanes to spin. Since movements of the gas molecules depend on the amount of heat in the system, and increasing

the light level results in additional heat delivery, it follows that the speed of the vane rotation is dependant on the intensity of the light.



Radiometer setup.



Radiometer with Light

