

## Stephan's Law for Black Body Radiation

### Object:

Measure how the current through an electric light bulb varies as the applied voltage is changed. This will allow you to establish Stephan's Law for Black Body Radiation.

### Data Sheet

$V$	$I$	$R=V/I$	$P(W/m^2)$ <i>radiometer</i>	$T$
0.5				
1.0				
1.5				
2.0				
2.5				
3.0				
3.5				
4.0				
4.5				
5.0				
5.5				
6.0				
6.5				
7.0				
7.5				
	<b>&lt; 1.7 A</b>			

1) Verify Stephan's Law by fitting  $\ln(E)$  vs  $\ln(R)$  to a straight line. Attach your data plot and fit

2) Find the temperature of the tungsten filament at  $V=5V$ .

3) Place your hand in front of the radiometer and measure your power output on the lowest scale. Compare this with a direct calculation if your body temperature is  $98.6^\circ F$ . Comment on any differences.