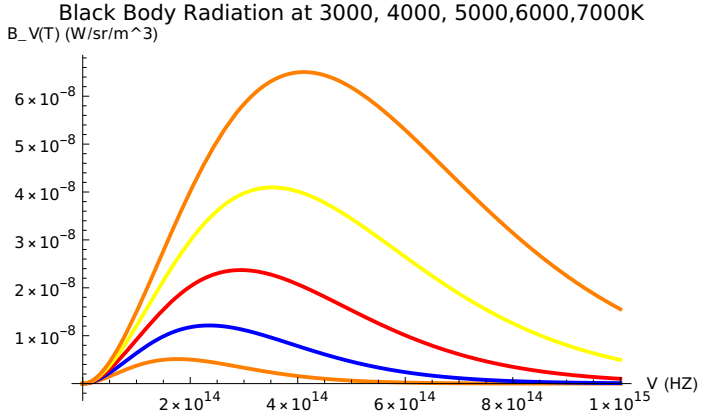
Sergio Quiroga Sandoval – Black Body Radiation in wolfram

1. Plot using the Frecuency form of the Black Body Radiation

```
h = 6.62607015 * 10^-34; (* Planck constant in J s *)
c = 299 792 458; (* Speed of light in m/s *)
kB = 1.380649 * 10^-23; (* Boltzmann constant in J/K *)

PlanckDistribution[v_, T_] := (2 * h * v^3) / c^2 * (1 / (Exp[(h * v) / (kB * T)] - 1))
Show[{Plot[PlanckDistribution[v, 3000], {v, 0, 1 * 10^15}, PlotStyle → Orange],
 Plot[PlanckDistribution[v, 4000], {v, 0, 1 * 10^15}, PlotStyle → Blue],
 Plot[PlanckDistribution[v, 5000], {v, 0, 1 * 10^15}, PlotStyle → Red],
 Plot[PlanckDistribution[v, 6000], {v, 0, 1 * 10^15}, PlotStyle → Yellow],
 Plot[PlanckDistribution[v, 7000], {v, 0, 1 * 10^15}, PlotStyle → Orange]},
  PlotRange → All,
  AxesLabel → {"V (HZ)", "B_V(T) (W/sr/m^3)"},
  PlotLabel → "Black Body Radiation at 3000, 4000, 5000,6000,7000K"]
```

Out[466]=



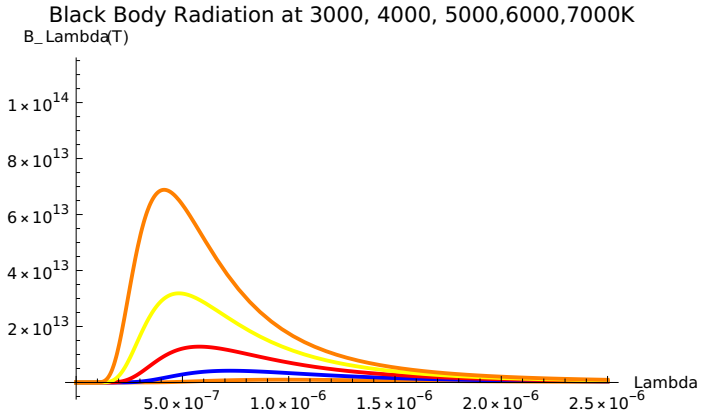
2. Plot using the wavelenght form of the Black Body Radiation

```
h = 6.62607015 * 10^-34; (* Planck constant in J s *)
c = 299 792 458; (* Speed of light in m/s *)
kB = 1.380649 * 10^-23; (* Boltzmann constant in J/K *)

PlanckDistribution[lambda_, T_] :=
(2 * h * c^2) / lambda^5 * (1 / (Exp[(h * c) / (lambda * kB * T)] - 1))

Show[
{Plot[PlanckDistribution[lambda, 3000], {lambda, 0, 2.5 * 10^-6}, PlotStyle → Orange],
 Plot[PlanckDistribution[lambda, 4000], {lambda, 0, 2.5 * 10^-6}, PlotStyle → Blue],
 Plot[PlanckDistribution[lambda, 5000], {lambda, 0, 2.5 * 10^-6}, PlotStyle → Red],
 Plot[PlanckDistribution[lambda, 6000], {lambda, 0, 2.5 * 10^-6}, PlotStyle → Yellow],
 Plot[PlanckDistribution[lambda, 7000],
  {lambda, 0, 2.5 * 10^-6}, PlotStyle → Orange]},
  PlotRange → {{0, 2.5 * 10^-6}, {0, 1.1 * 10^14}},
  AxesLabel → {"Lambda", "B_Lambda(T)"},
  PlotLabel → "Black Body Radiation at 3000, 4000, 5000,6000,7000K"]
```

Out[471]=



3. Plot Using the BlackBodyRadiation Wolfram Package

```
<< BlackBodyRadiation`
BlackBodyProfile[4000 Kelvin, 5000 Kelvin, 6000 Kelvin,
 PlotRange → {{0, 2.5 * 10^-6}, {0, 1.1 * 10^14}}]
```

Out[446]=