



The Stefan-Boltzmann law states that the emitted flux or power per unit area depends on the fourth power of the temperature.

$$W = \sigma T^4$$

The proportionality constant is $\sigma = 5.67 \times 10^{-8} \text{ W/m}^2/\text{K}^4$. This rather strong temperature dependence is shown in the figure by the comparison of calculated emission curves for four different temperatures. Stefan used this result based on previous observations to estimate the temperature of the sun in 1879. This result was derived using thermodynamics by Ludwig Boltzmann in 1884. The derivation used light instead of a gas. The Rayleigh-Jeans law does not agree with this result.