

### Answer on Question #74069, Physics / Quantum Mechanics

**Question** Use stefans law to calculate the total power radiated per square meter by a filament at 1727 C having an absorption factor of 0.4.

**Solution** The stefans law gives power per square meter:

$$j = \varepsilon\sigma T^4$$

where  $\sigma = 5.67 \times 10^{-8} \text{ W m}^{-2}\text{K}^{-4}$ . So we can find the power:

$$j = 0.4 \cdot 5.67 \cdot 10^{-8} \cdot 1727^4 \approx 201749.47 \text{ W}, \approx 202 \cdot 10^3 \text{ W}$$