

## Electric Bar Heater

**You want to heat a cold room using a simple electric bar heater. This consists of one conducting wire connected to the mains via a plug. In order to maximise the power, should you make the wire thinner or thicker?**

Answer

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First remember that the mains is a voltage source (i.e.  $V$  is fixed). Start with power  $P=IV$  and then use Ohm's law  $V=IR$  to eliminate  $I$  and find  $P=V^2/R$ . Clearly we need as low a resistance as possible and therefore we want a thicker wire.