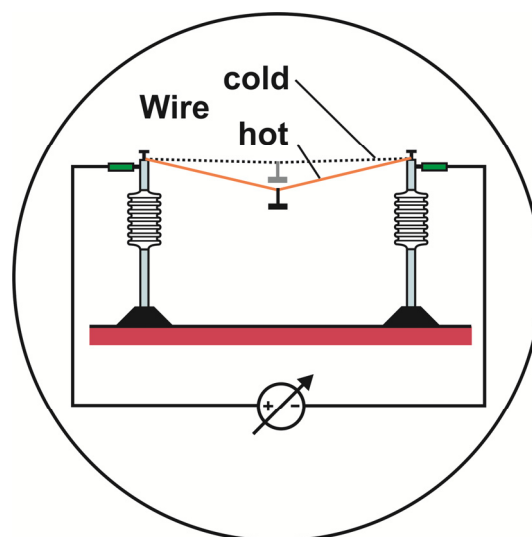


# Expansion of a Wire Caused by Electric Current

## Equipment:

power supply e.g. 25 V, 10 A  
two isolating supports  
resistance wire (thin)  
    e.g. constantan wire ( $600 \times 0.4 \text{ mm } \varnothing$ )  
weight (10 to 20 g) e.g. big nut or  
    hook weight  
two cables  
"height indicator" e.g. glass rod in a stopper  
    with a hole



## Chemicals

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## Safety:

The wire should not be touched as long as the current flows through it.

## Procedure:

Preparation: The thin wire is stretched between the two isolating supports the weight being located in the middle of the wire. The "height indicator" is placed below the weight. Subsequently, each of the isolating supports is connected by one of the cables with the power supply.

Procedure: First, the current is slowly increased. Subsequently, the current is decreased again.

## Observation:

The weight in the middle of the wire slowly sinks down with increasing current. At higher current, the wire also begins to glow. If the current is decreased the weight moves upwards again. The movement of the weight can be observed especially clearly with the help of shadows created by a lamp.

## Explanation:

Entropy is generated by the electric current. As *main* effect of the increase in entropy the wire becomes warmer and finally begins to glow. But the increasing entropy also causes a *side* effect: The wire lengthens noticeably. The effect can be easily observed by the lowering of the weight. If the electric current is decreased again, also the entropy generated in the wire decreases; the wire gradually cools down and shrinks again.

## Disposal:

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