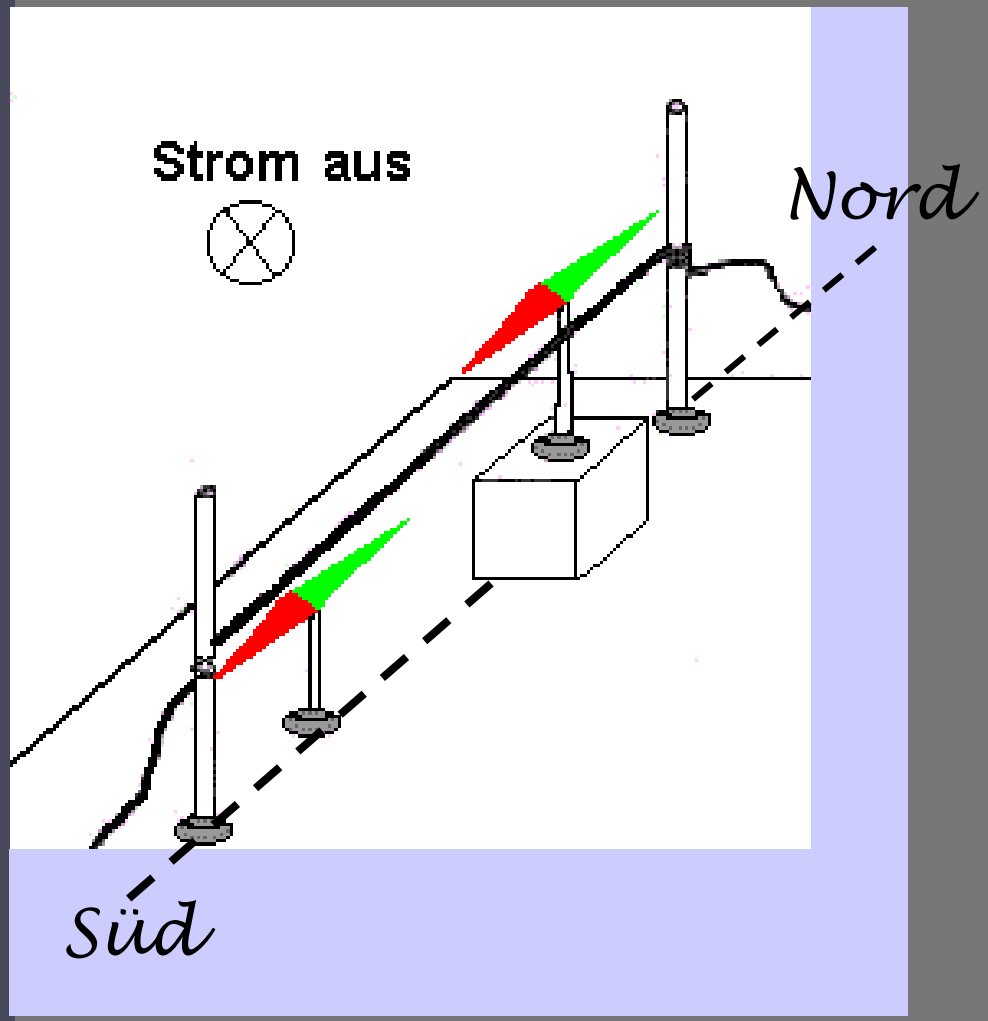
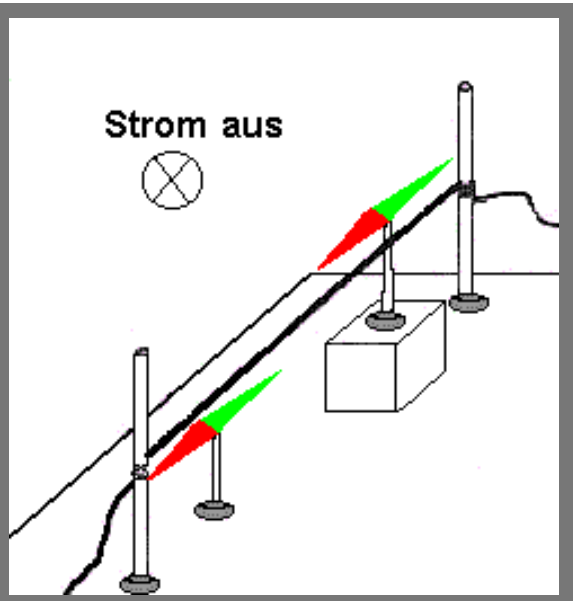
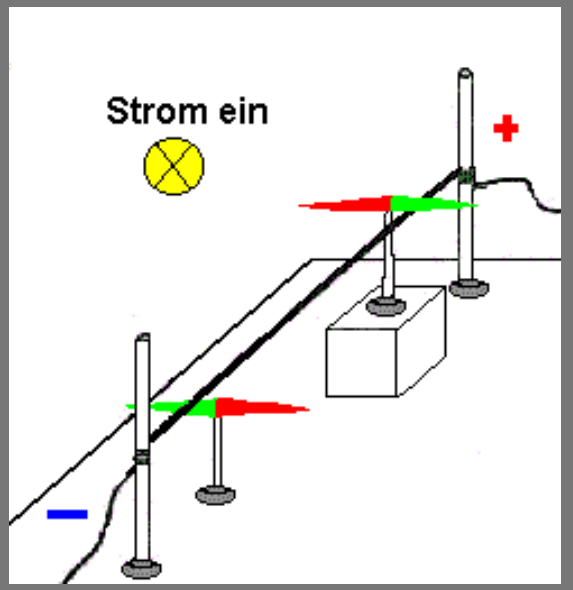
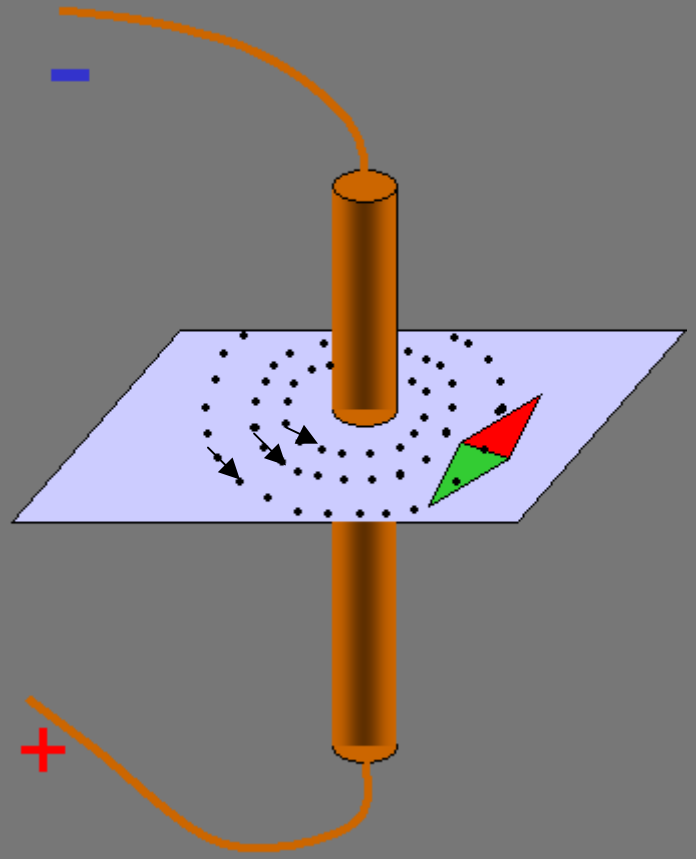
Magnetfeld eines stromdurchflossenen Leiters

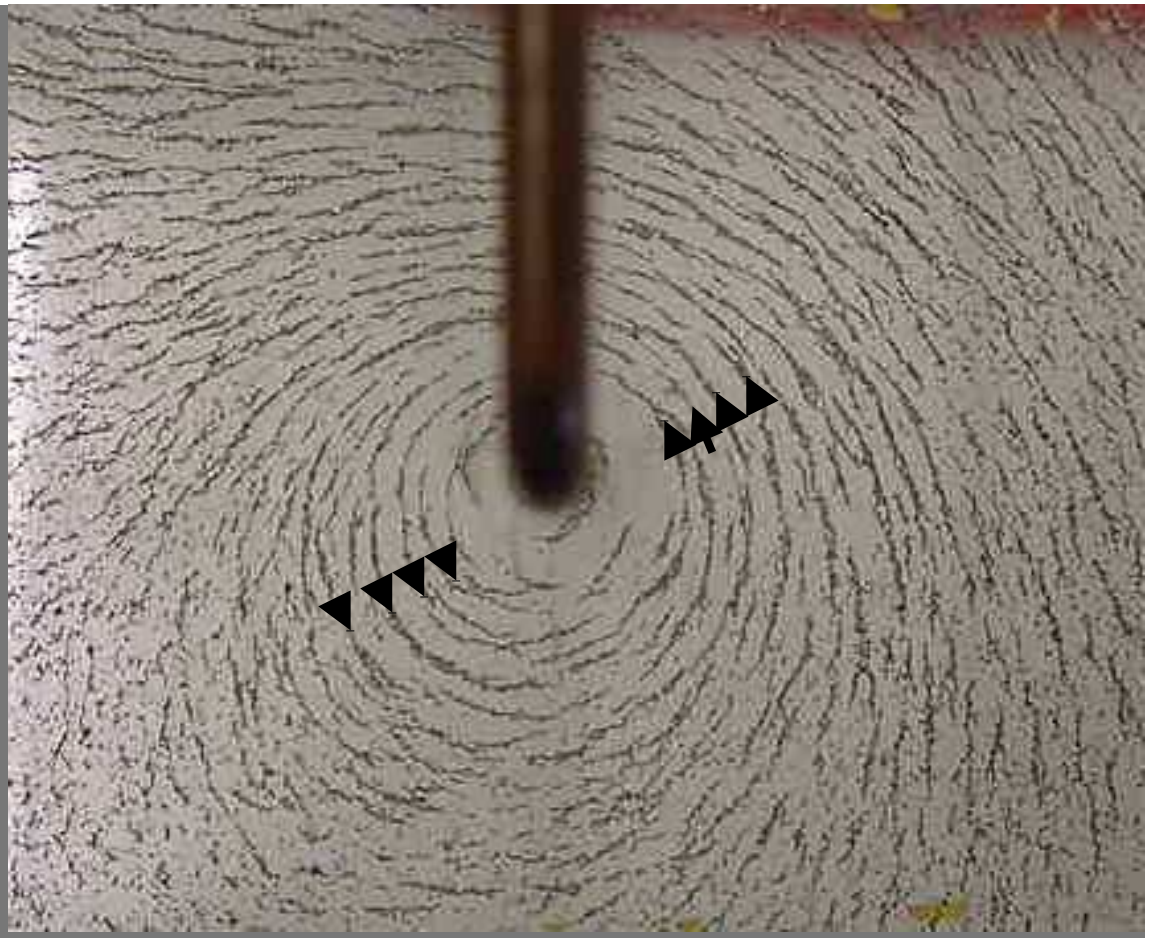




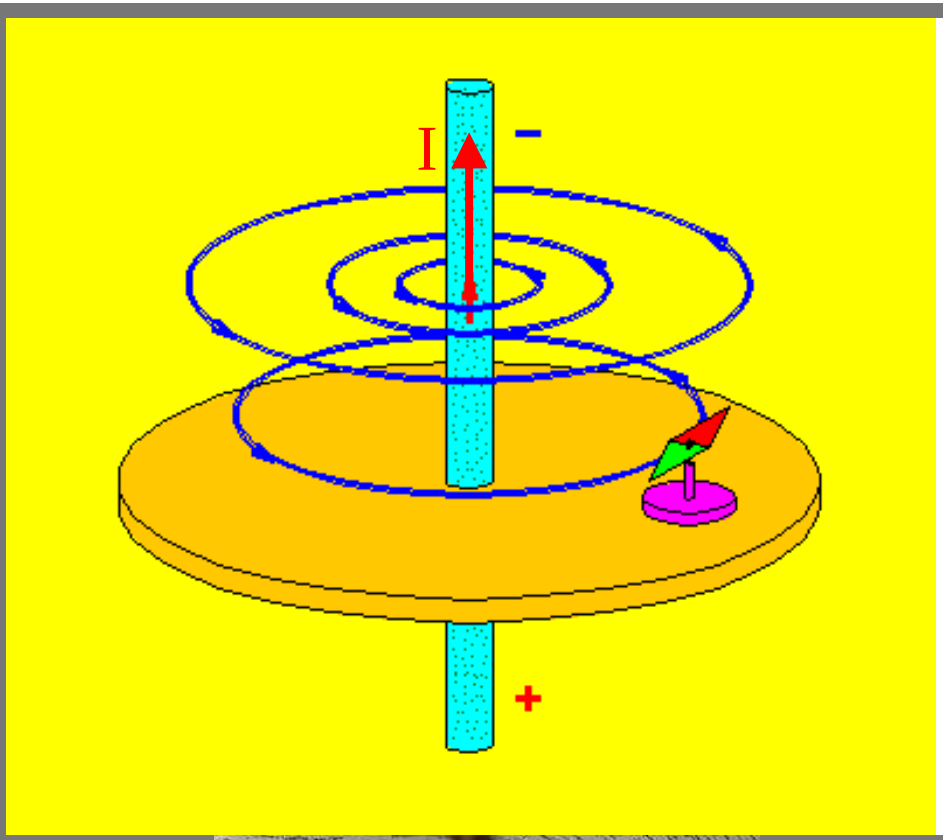


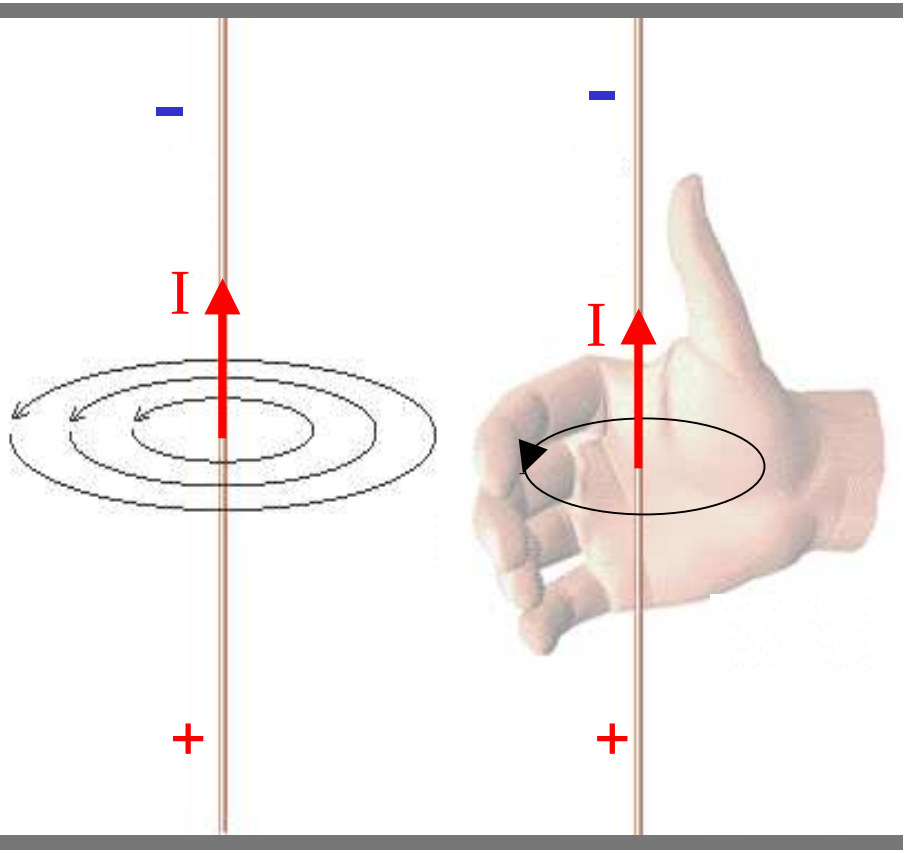
Magnetfeld eines stromdurchflossenen Leiters





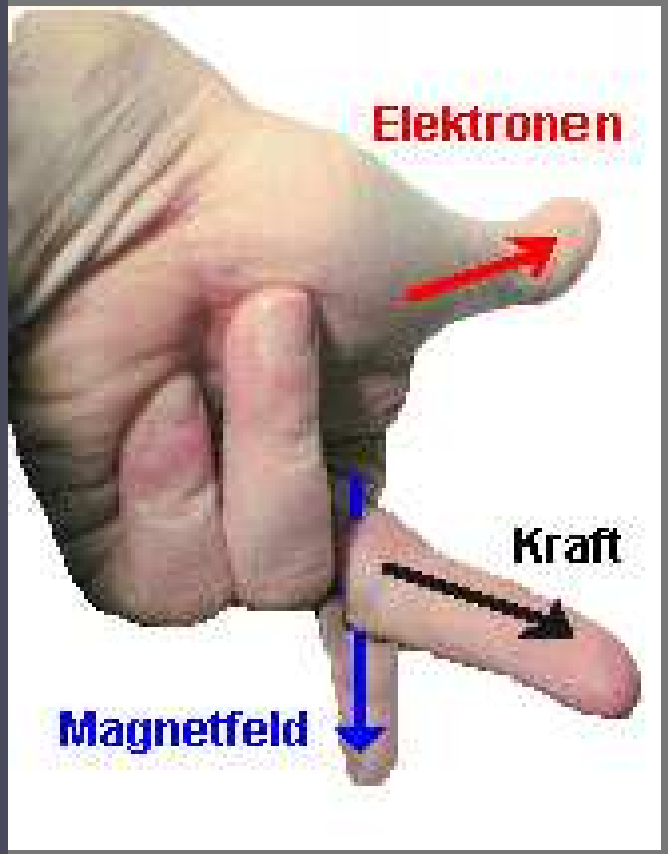
Magnetfeld eines stromdurchflossenen Leiters

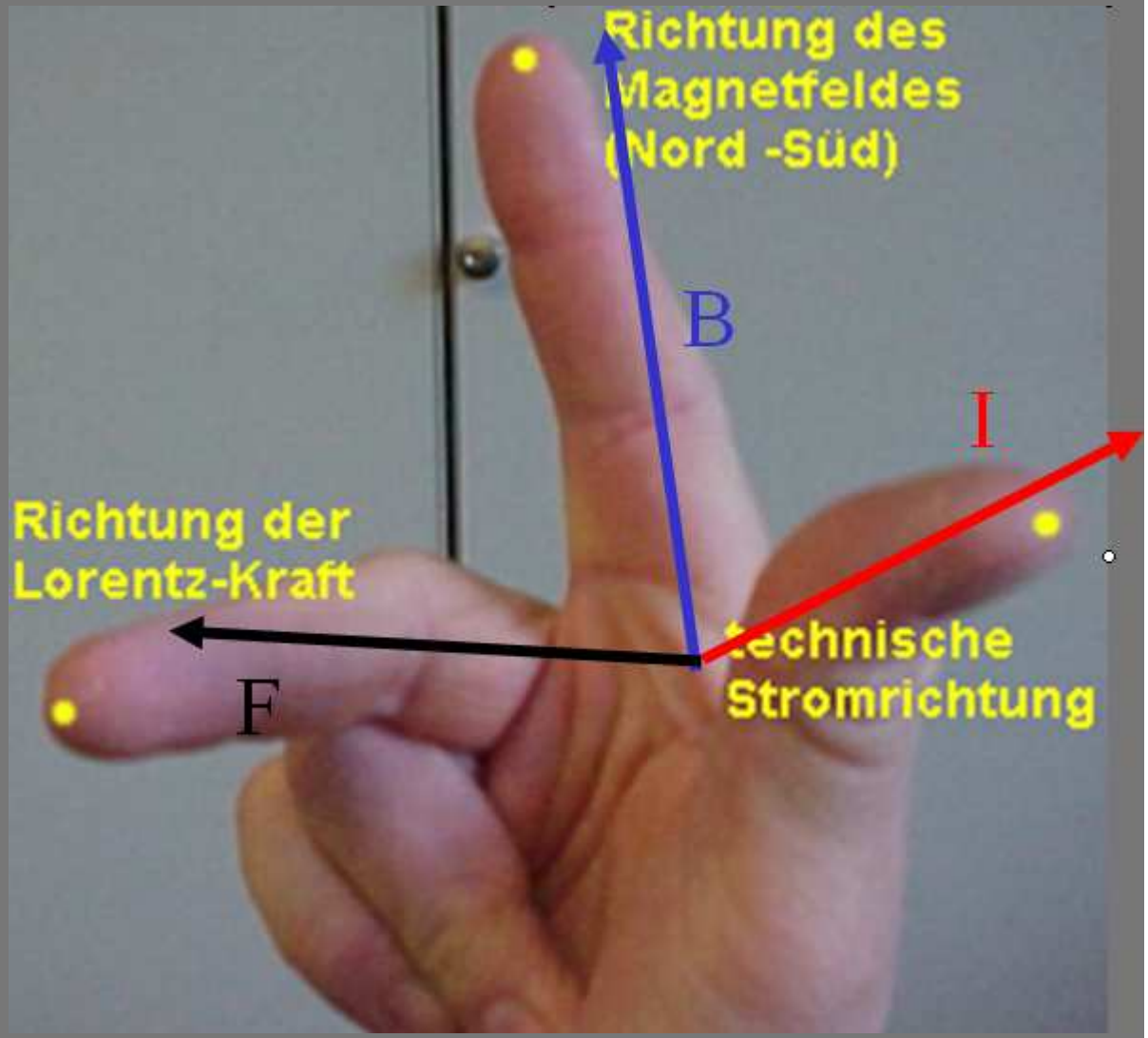




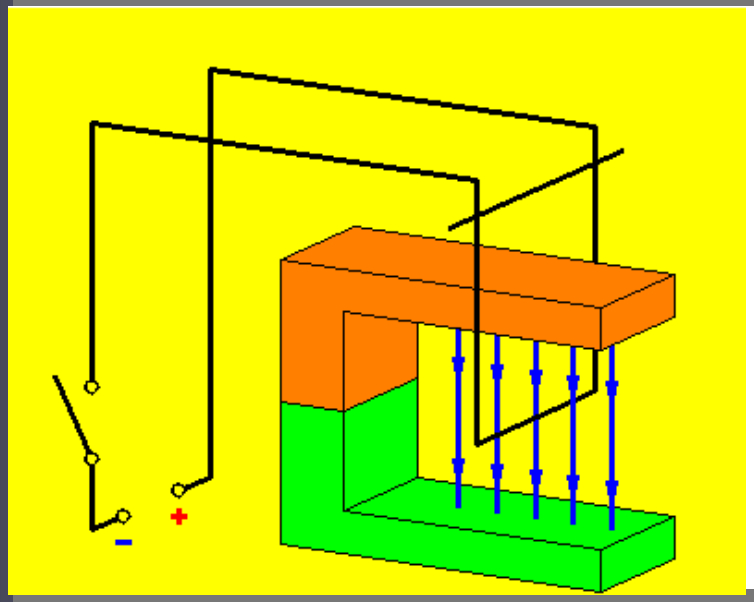
Die Rechte-Hand-Regel

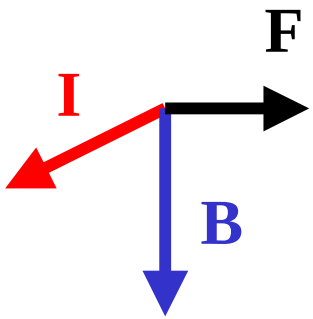
Dreifingerregel der linken (rechten) Hand

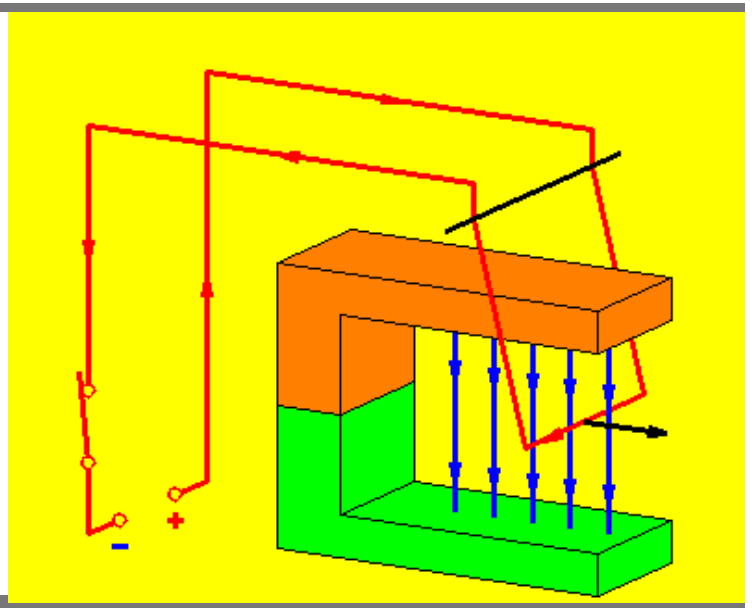


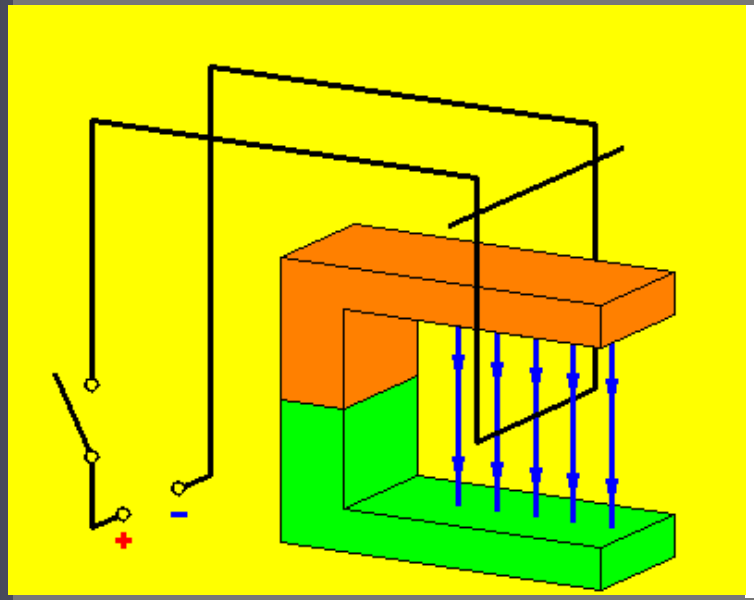


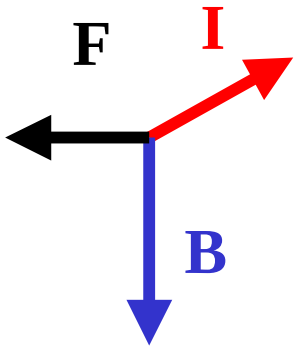
Die Richtung der Lorentzkraft (Dreifingerregel)

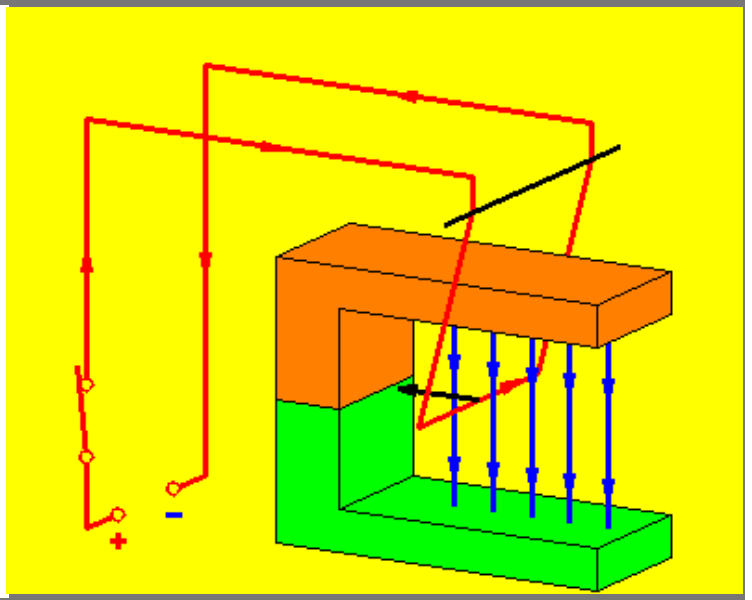




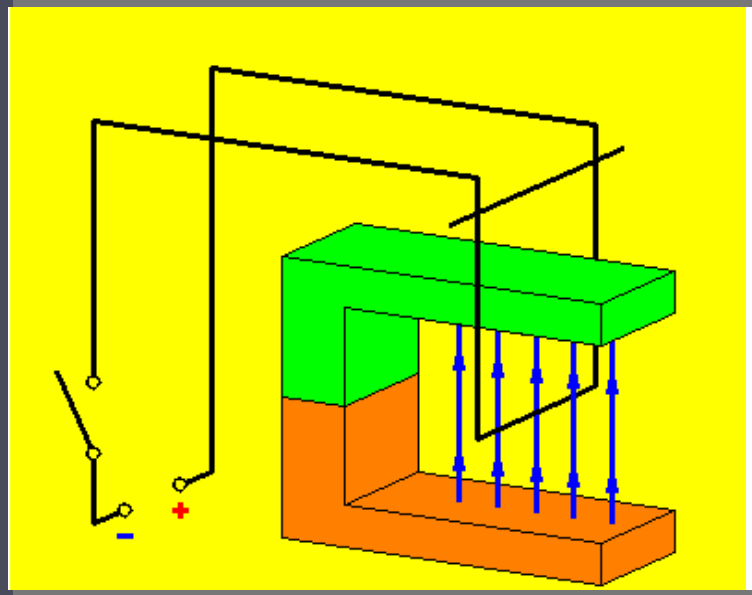


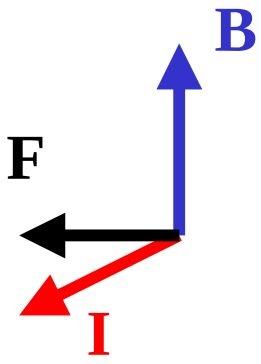


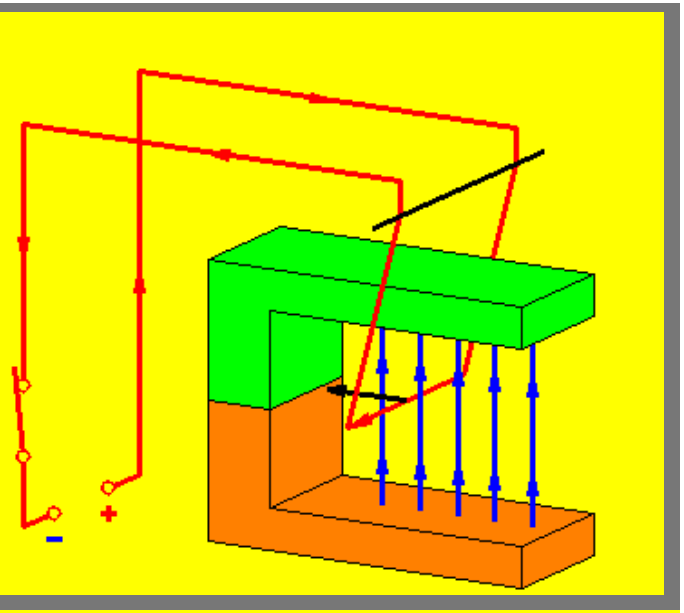


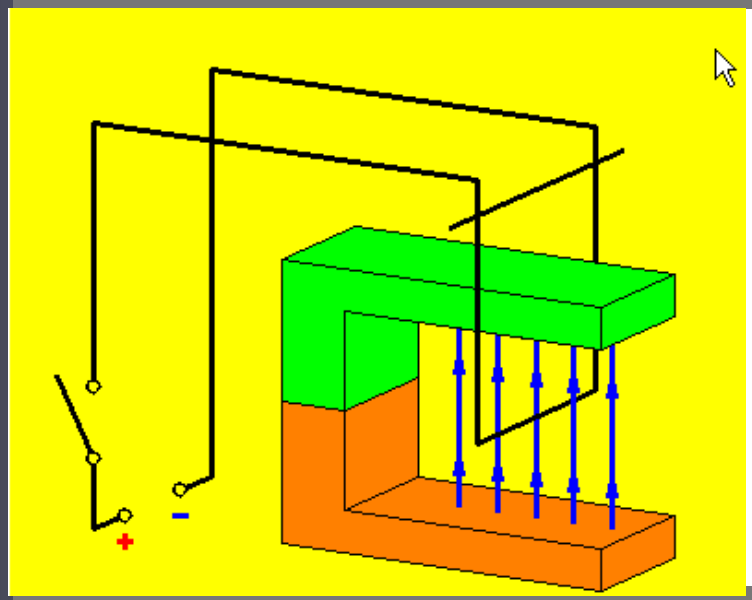


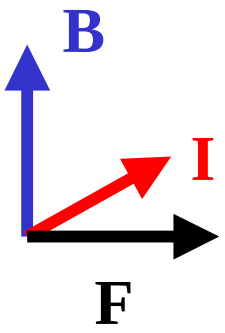
Die Richtung der Lorentzkraft (Dreifingerregel)

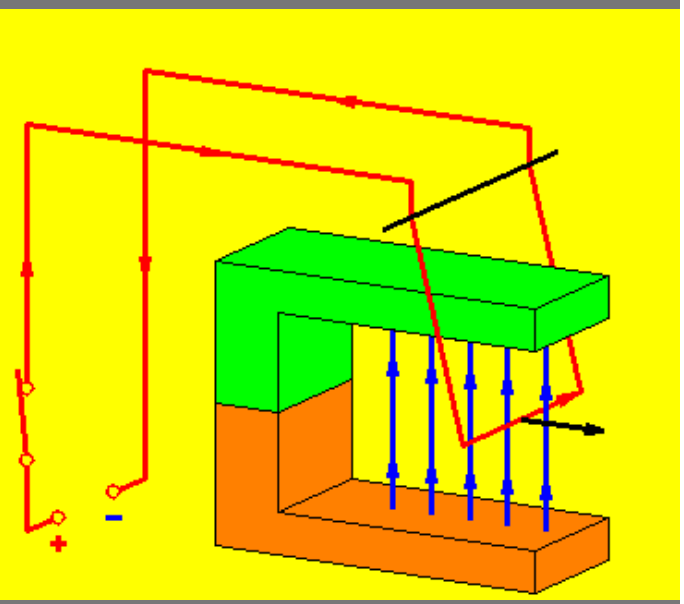




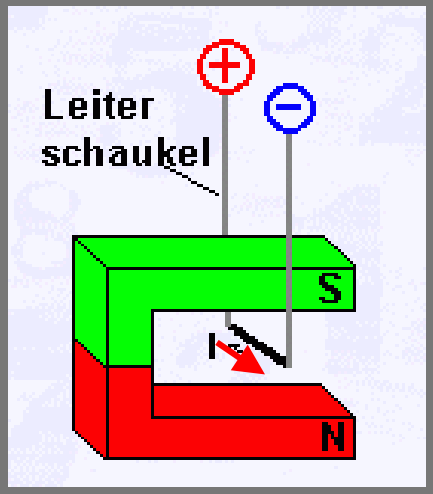


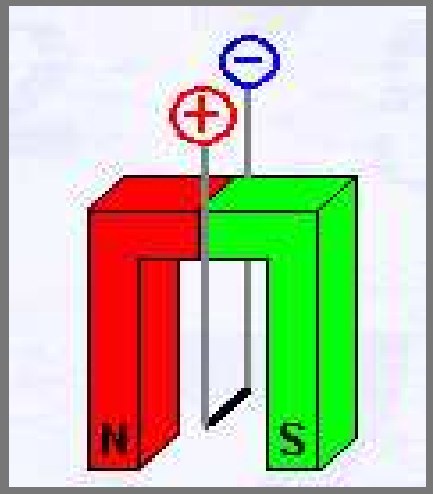


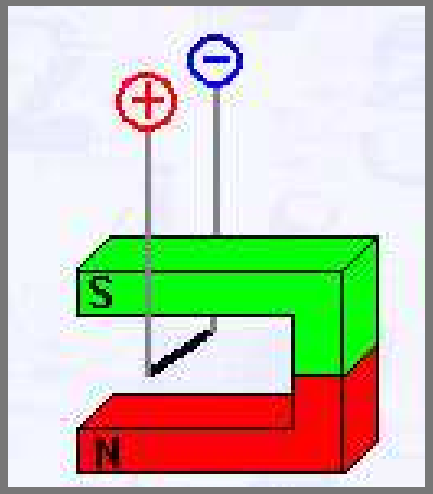


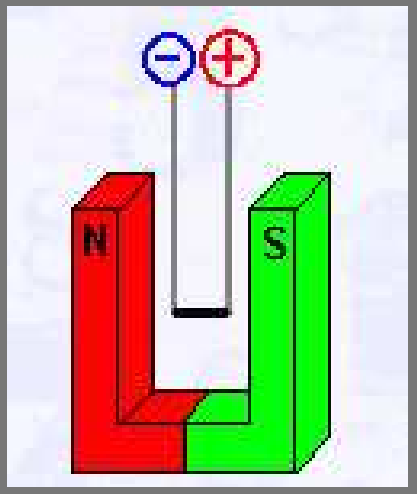


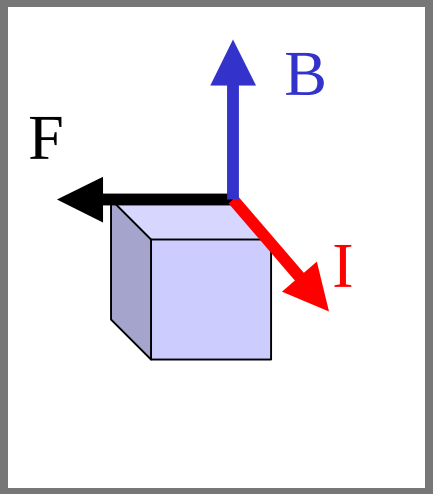
Welche Richtung hat die Lorentzkraft ?

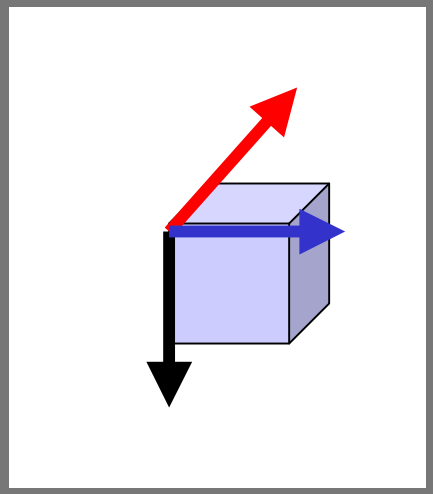


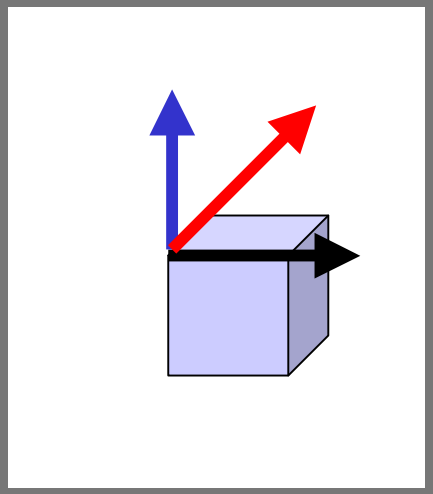


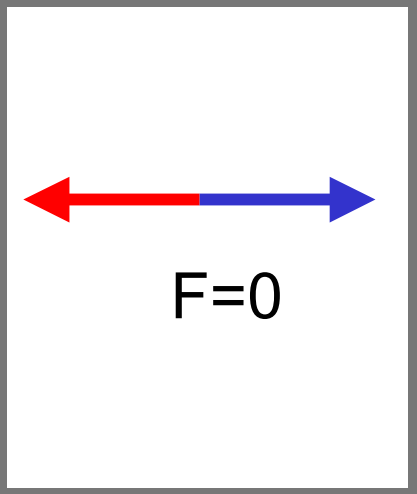






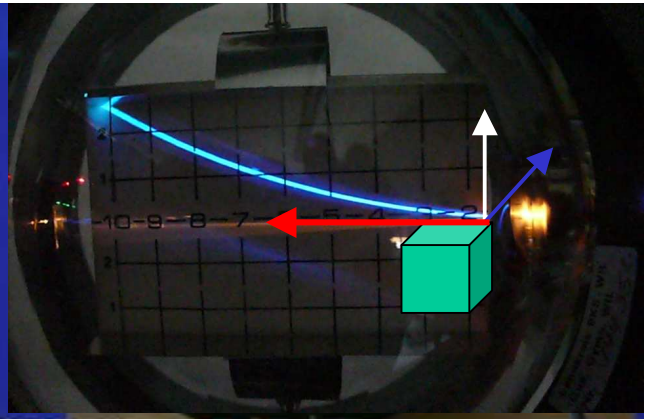






Elektronenstrahlröhre

Ablenkung eines Elektronenstrahls im Magnetfeld



Elelektronenstrahlröhre

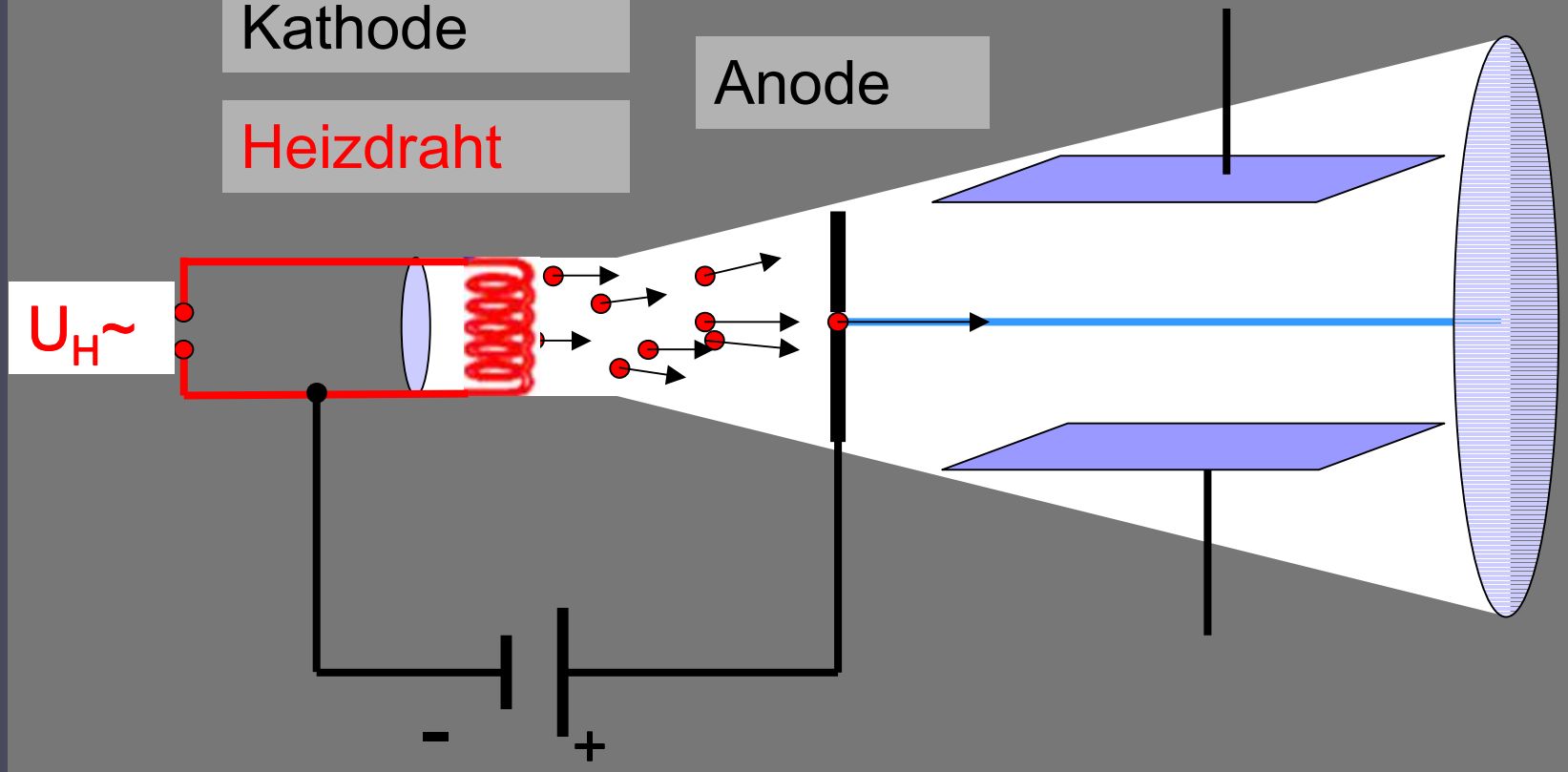
Röhre mit Gas unter ganz geringem Druck

Ablenkplatten

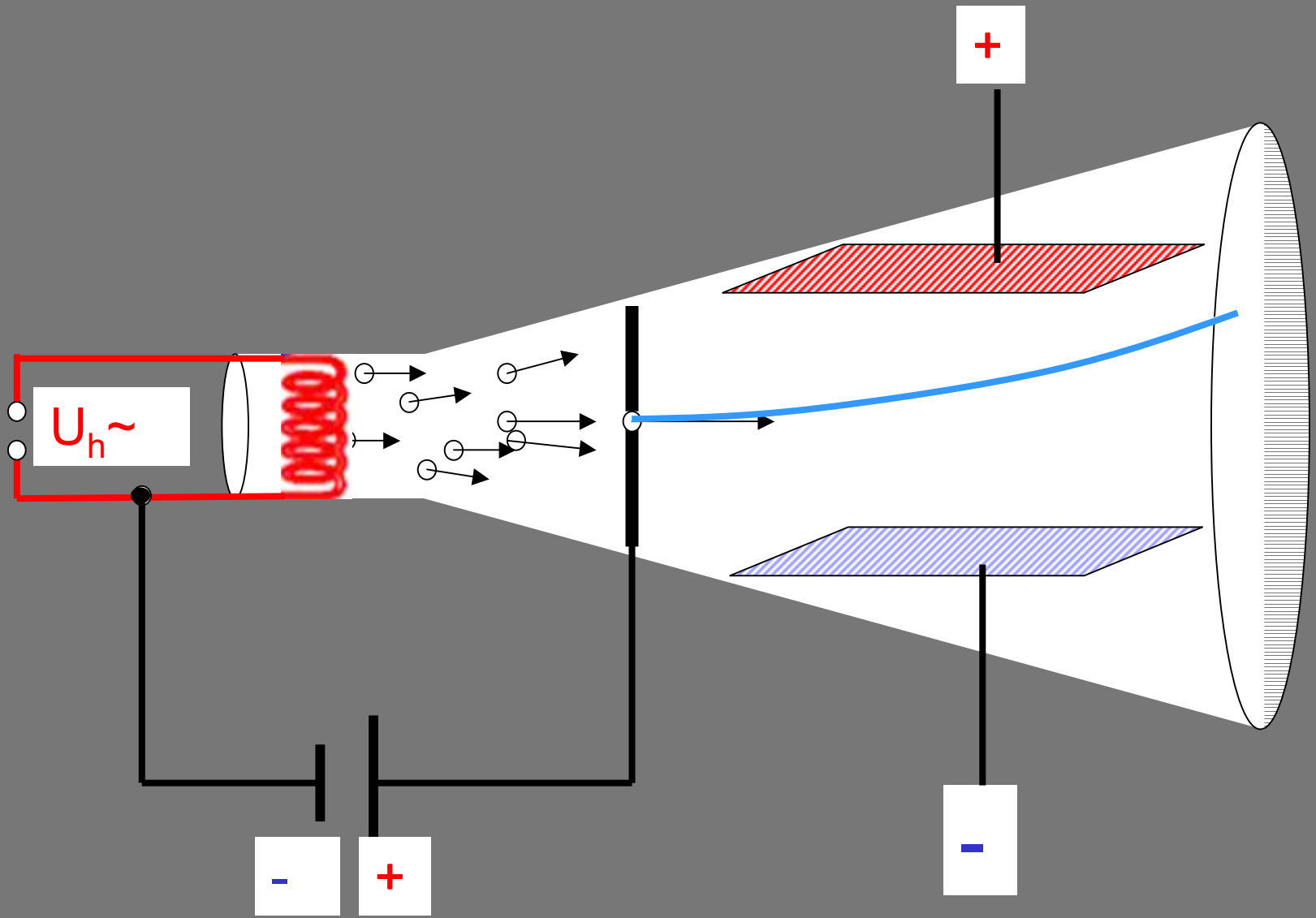
Kathode

Anode

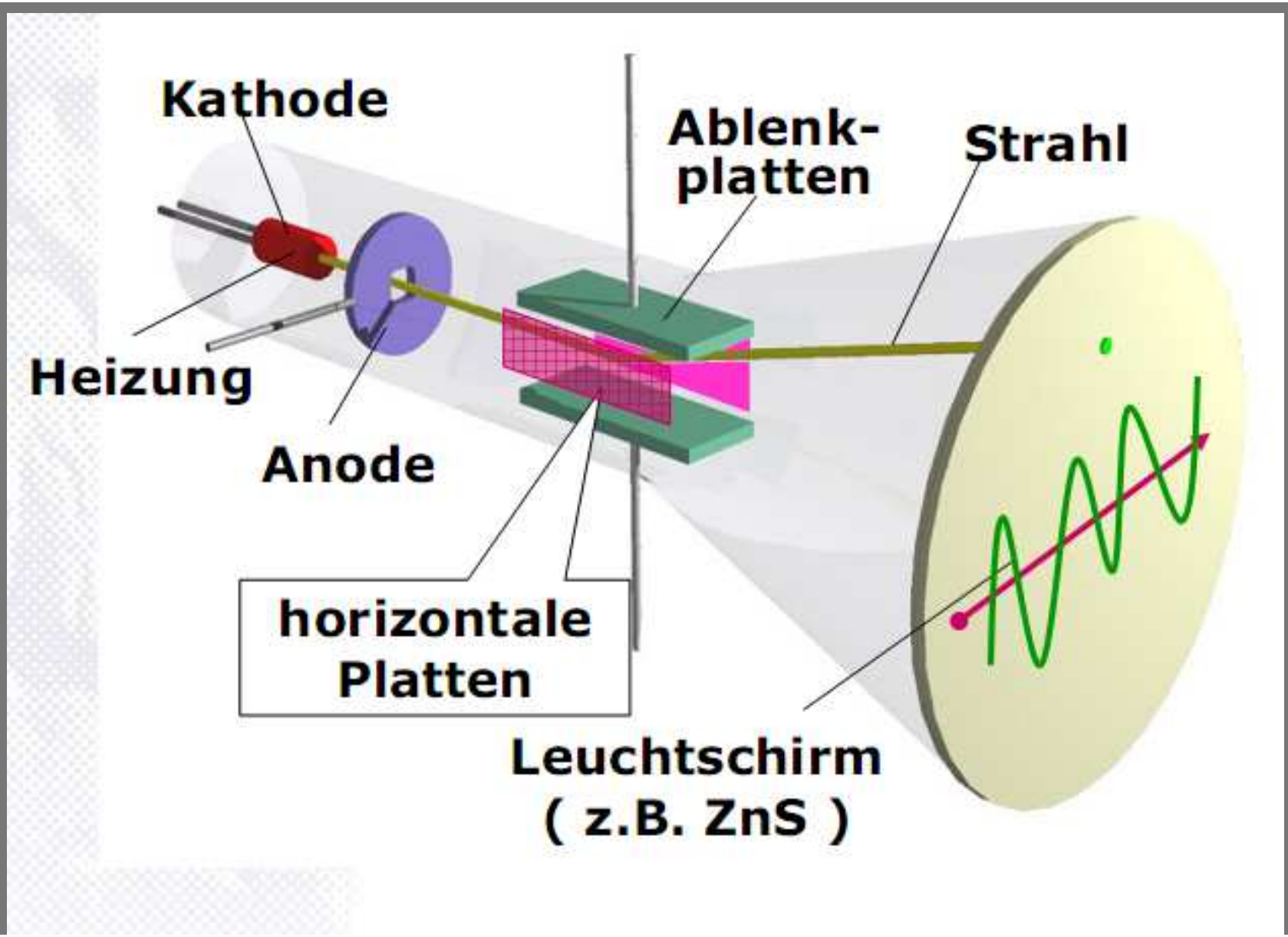
Heizdraht



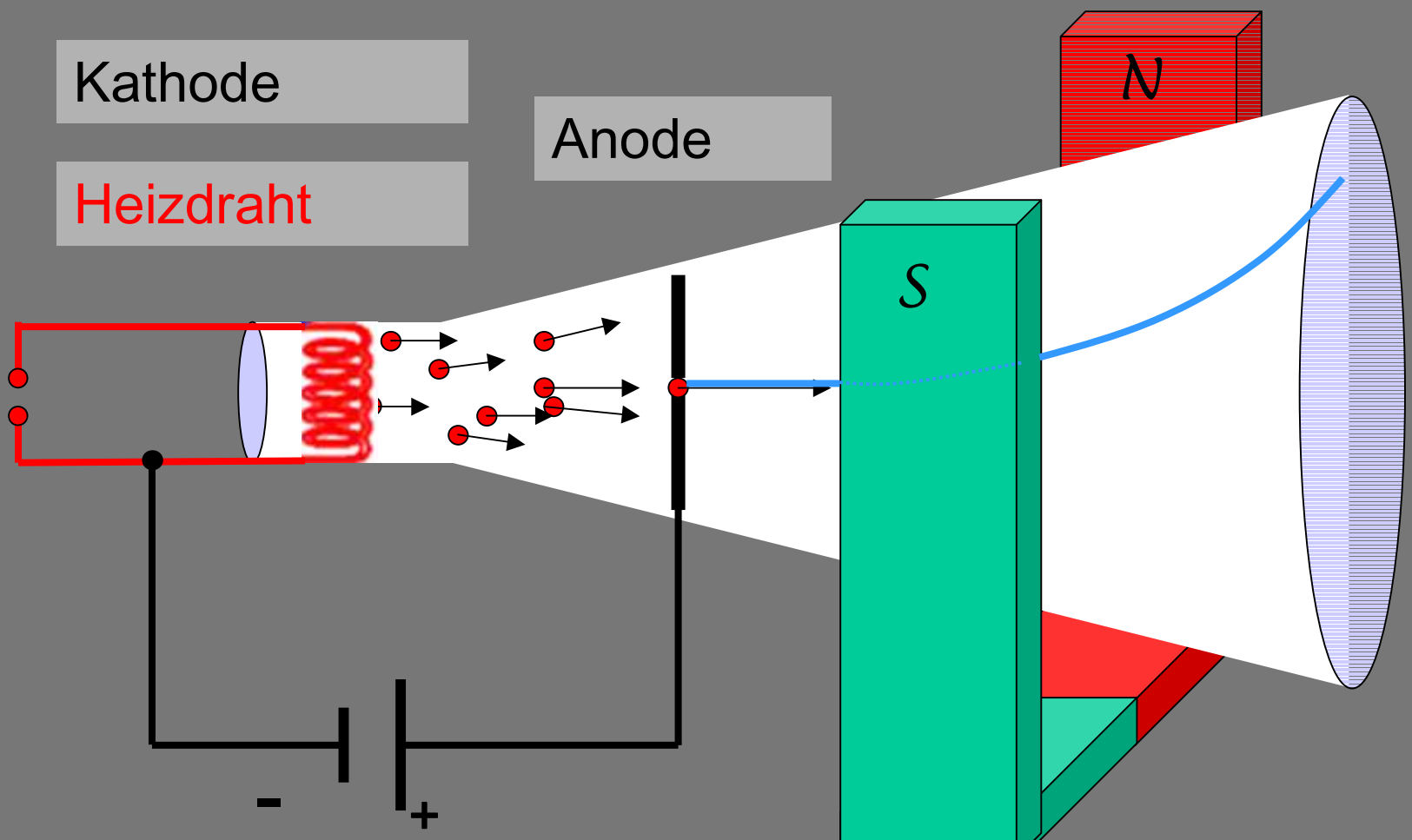
Elelektronenstrahlröhre



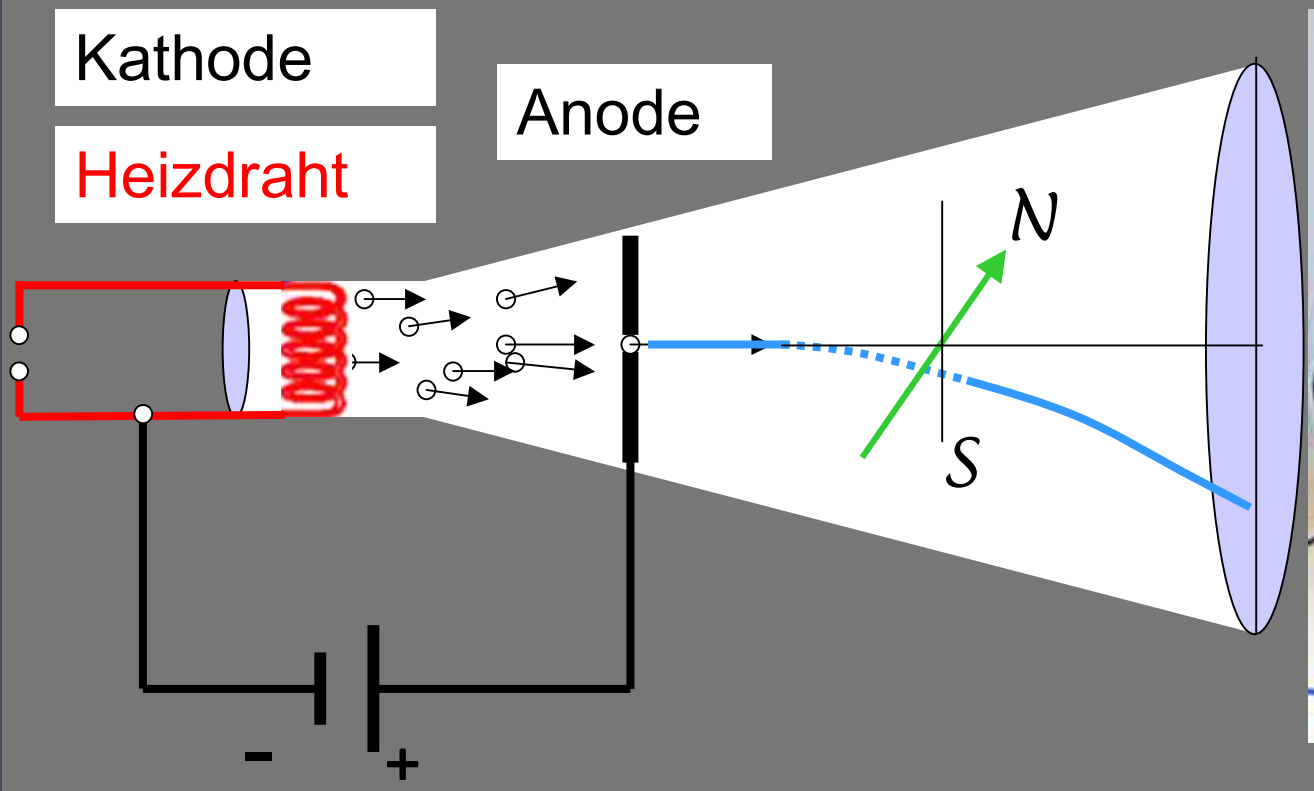
Prinzip des Oszilloskops /Fernsehröhre

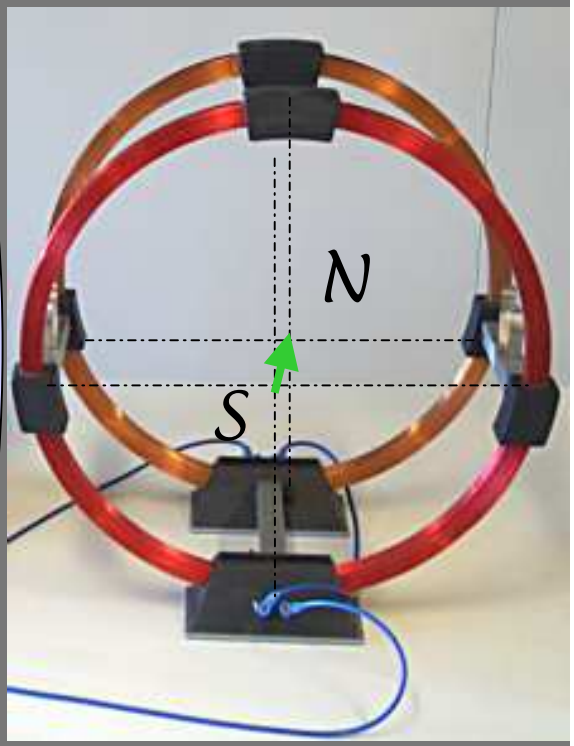


Ablenkung mit Magnetfeldern

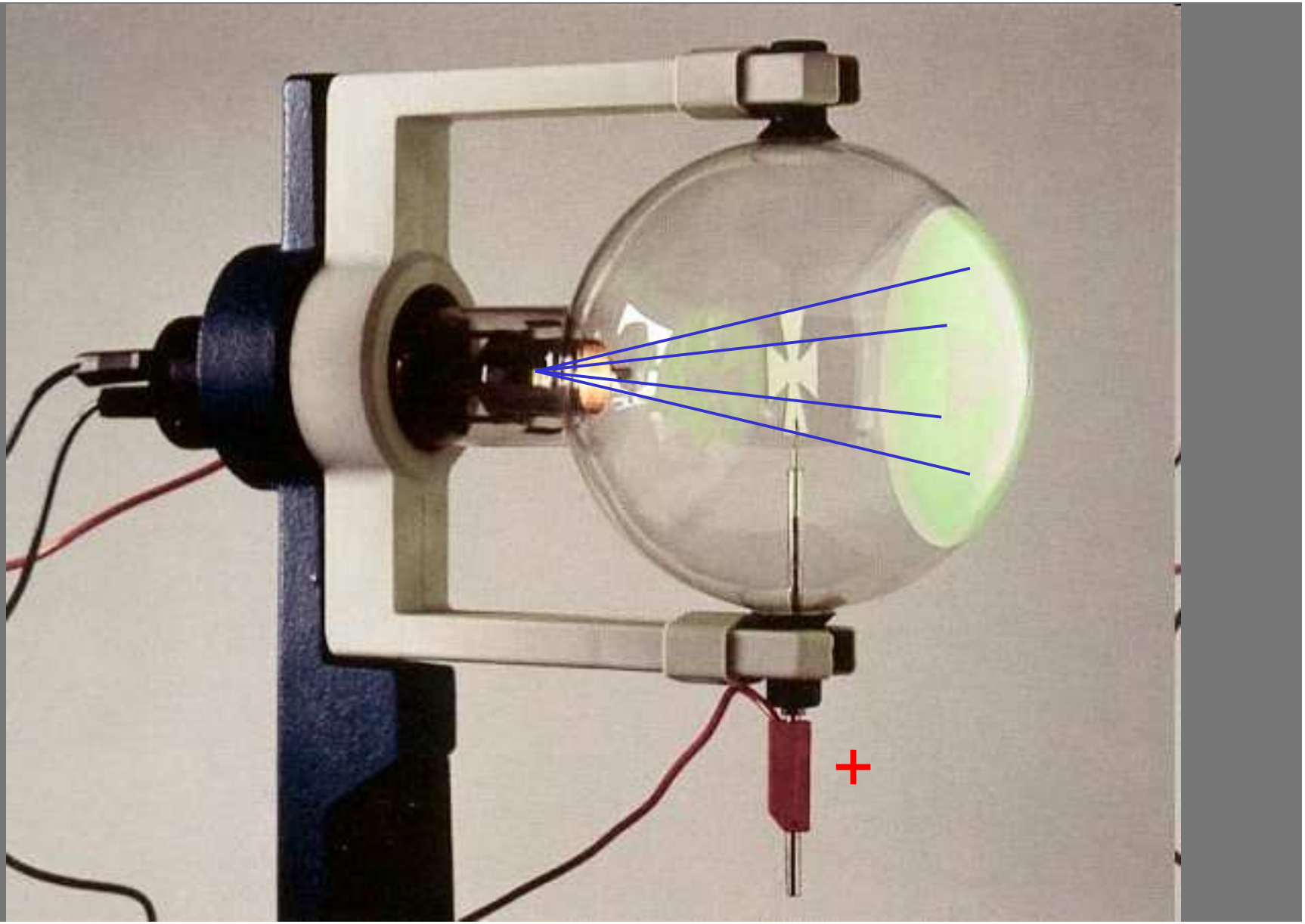


Magnetfeld mit Helmholtzspule

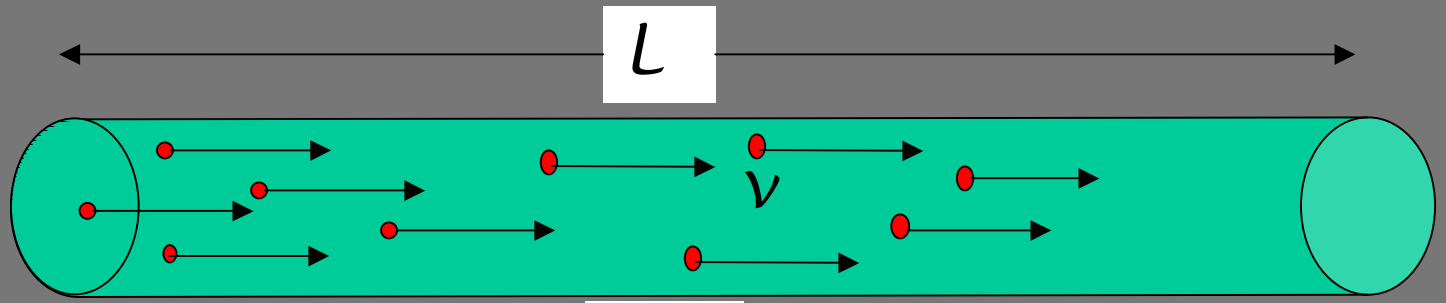




Elektronenstrahlen - Schatten



Lorenzkraft auf einzelne Elektronen



$$v = \frac{L}{\Delta t}$$

In der Zeit Δt fließen N Elektronen durch das Leiterstück:

$$Q = N \cdot e$$

$$\Rightarrow I = \frac{Q}{\Delta t} = -\frac{N \cdot e}{\Delta t}$$

$$F_L = I \cdot L \cdot B = -\frac{N \cdot e}{\Delta t} \cdot v \cdot \Delta t \cdot B$$

Lorentzkraft auf ein einzelnes Elektron

Für die Lorentzkraft auf ein einzelnes Elektron im Magnetfeld B ergibt sich:

$$F_{L(e)} = \frac{F_L}{N} = e \cdot v \cdot B$$

$$\vec{F}_{L(e)} = -e \cdot (\vec{v} \times \vec{B})$$

$$F_{L(e)} = e \cdot v \cdot B \cdot \sin \sphericalangle(\vec{v}, \vec{B})$$

Der Hall-Effekt

$$\vec{F}_{L(e)} = e \cdot (\vec{v} \times \vec{B})$$