

DER TRANSFORMATOR und andere Transformatoren

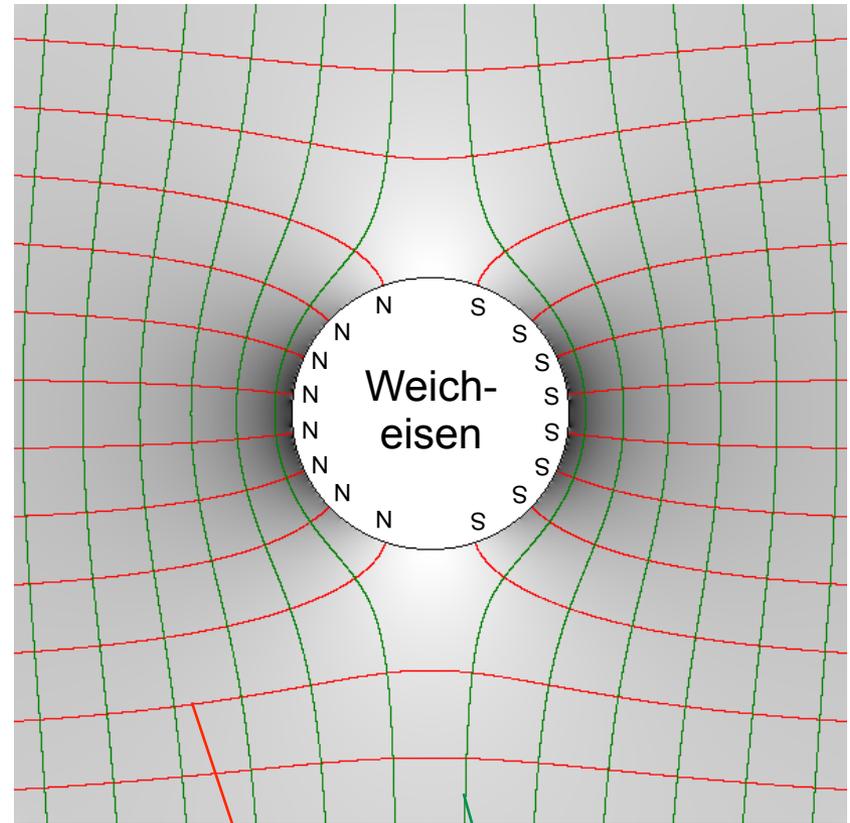
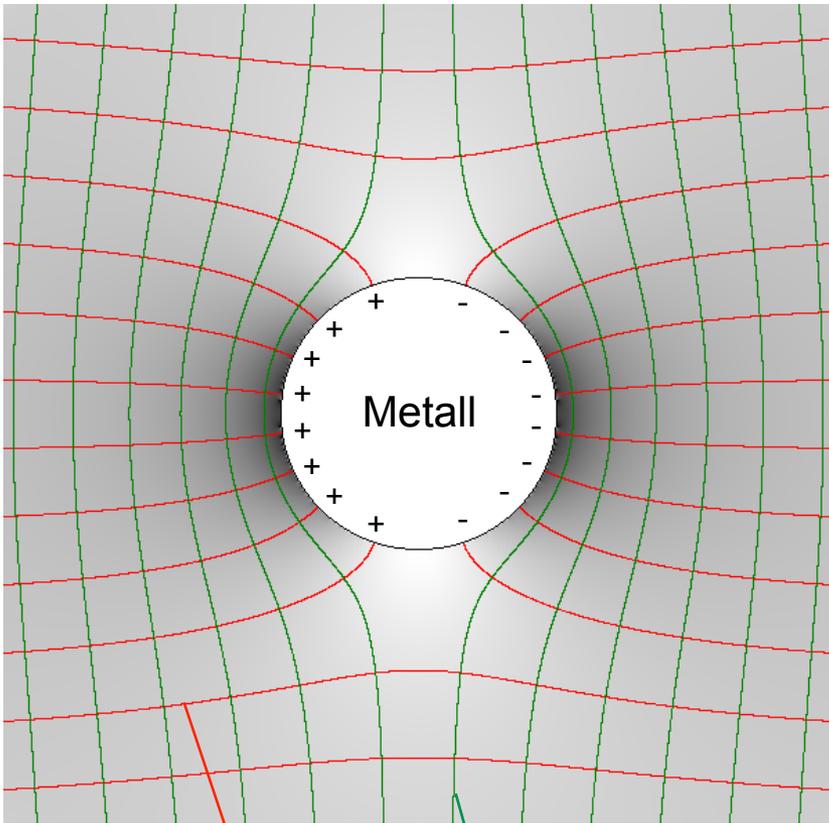
F. Herrmann, Karlsruher Institut für Technologie



www.physikdidaktik.uni-karlsruhe.de

Der elektrische Transformator

Andere Transformatoren

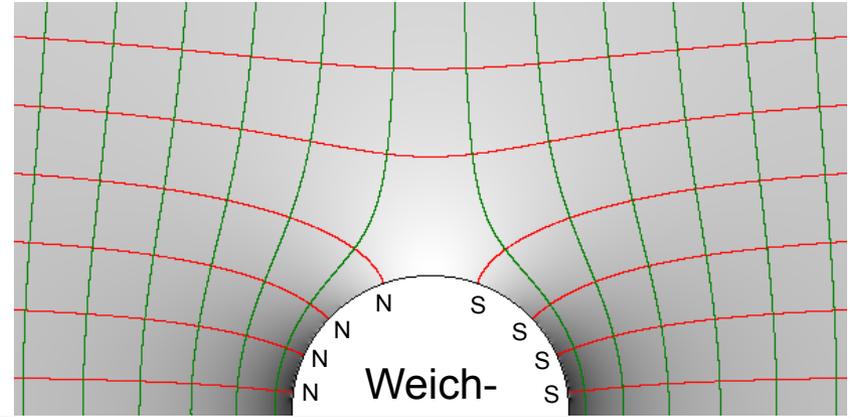
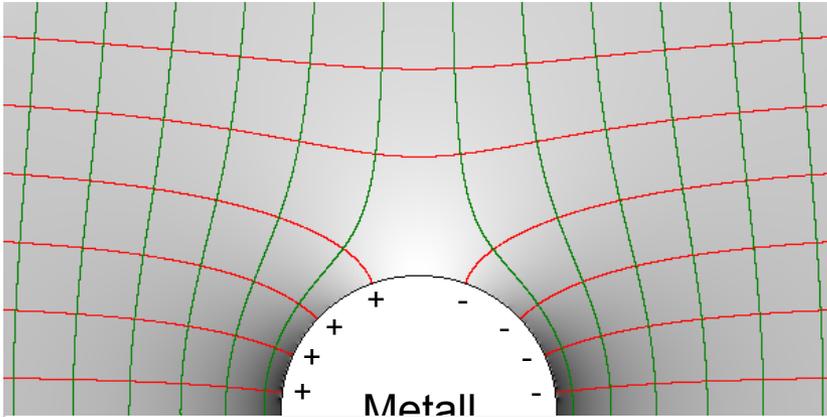


\vec{E}

$\varphi_e = \text{const}$

\vec{H}

$\varphi_m = \text{const}$



Unterricht:
Benutze in der Magnetostatik nicht B , sondern H .

\vec{E}

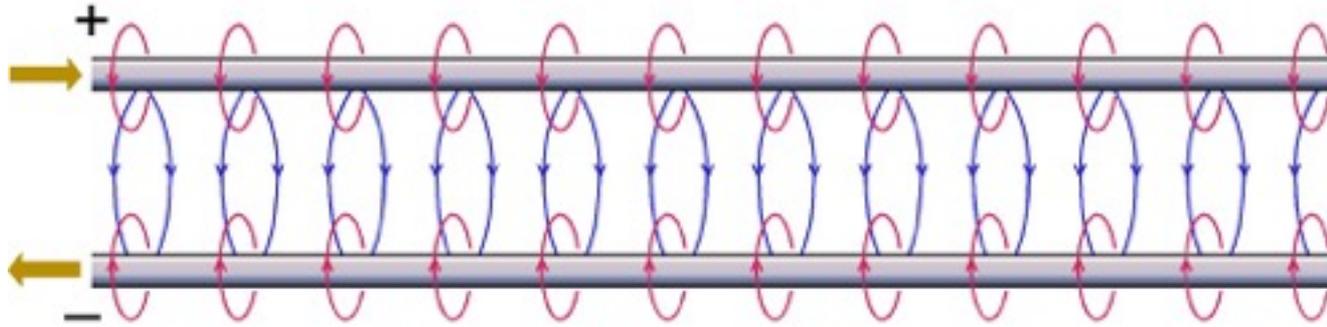
$\varphi_e = \text{const}$

\vec{H}

$\varphi_m = \text{const}$

elektrische Feldstärke E

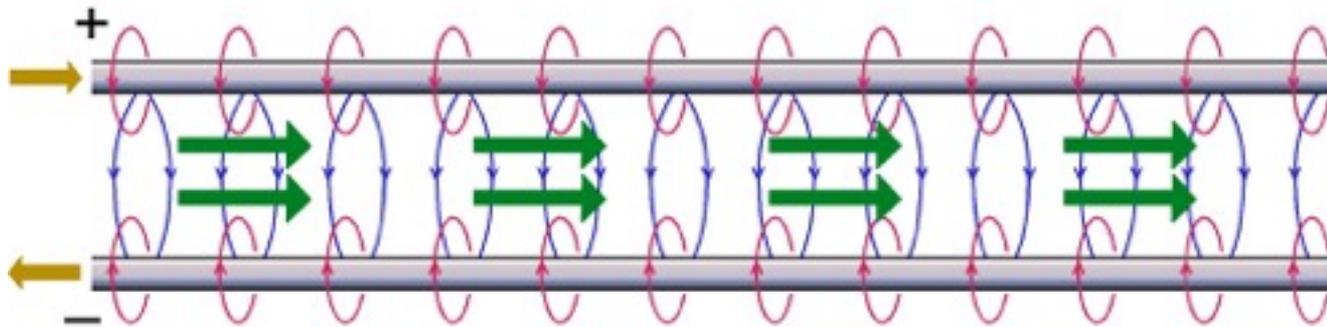
magnetische Feldstärke H



elektrische Feldstärke E

magnetische Feldstärke H

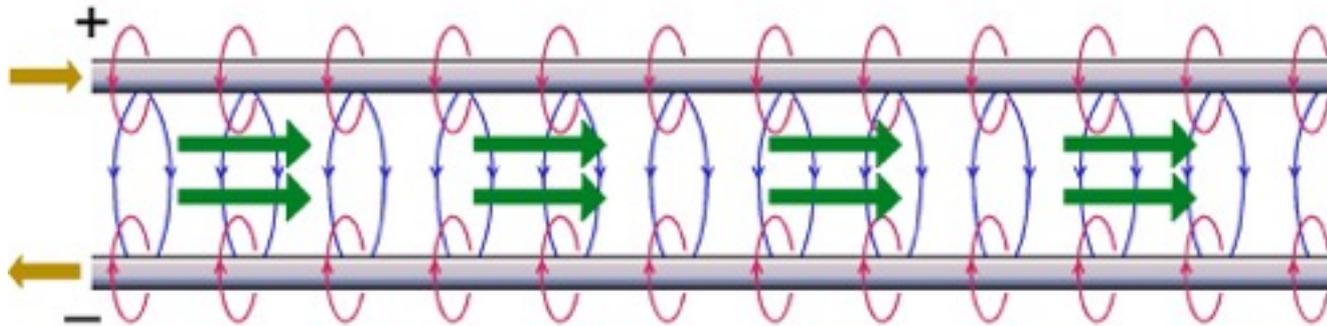
Energiestrom $E \times H$



elektrische Feldstärke E

magnetische Feldstärke H

Energiestrom $E \times H$

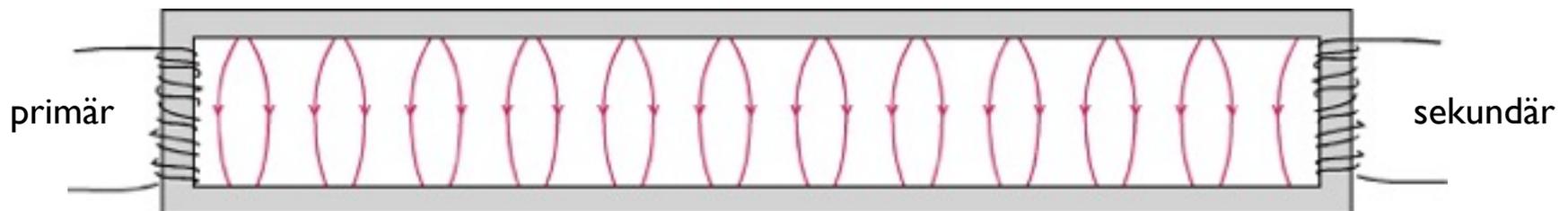
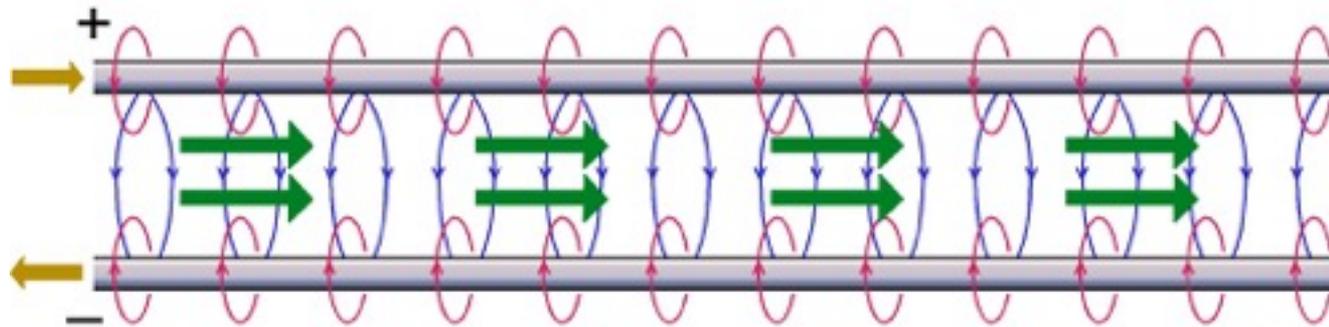


$$\oint H dr = n \cdot I$$

elektrische Feldstärke E

magnetische Feldstärke H

Energiestrom $E \times H$

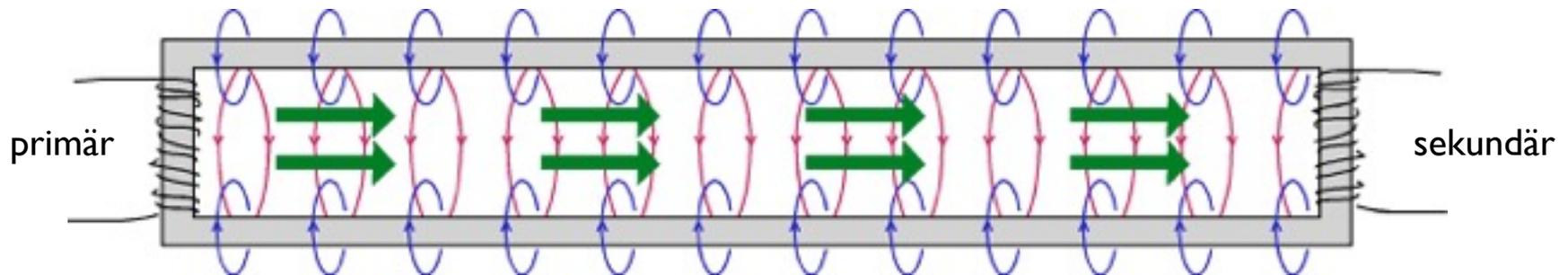
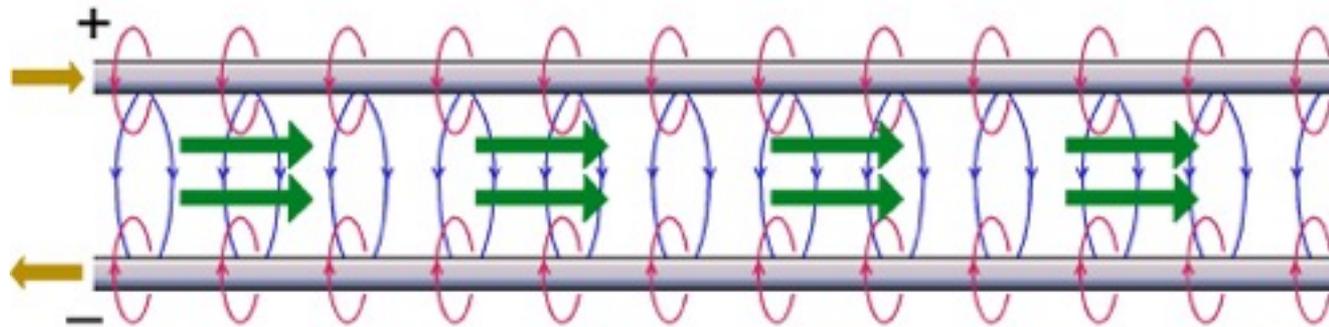


Der elektrische Transformator

elektrische Feldstärke E

magnetische Feldstärke H

Energiestrom $E \times H$



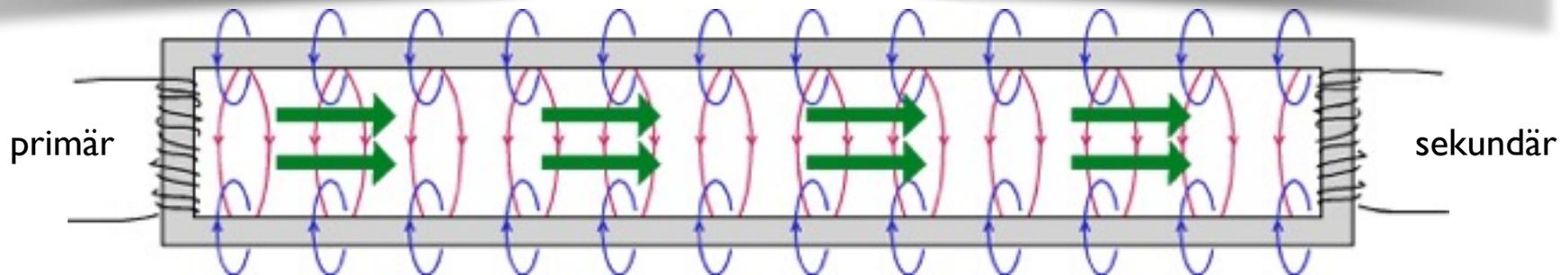
elektrische Feldstärke E

magnetische Feldstärke H

Energiestrom $E \times H$

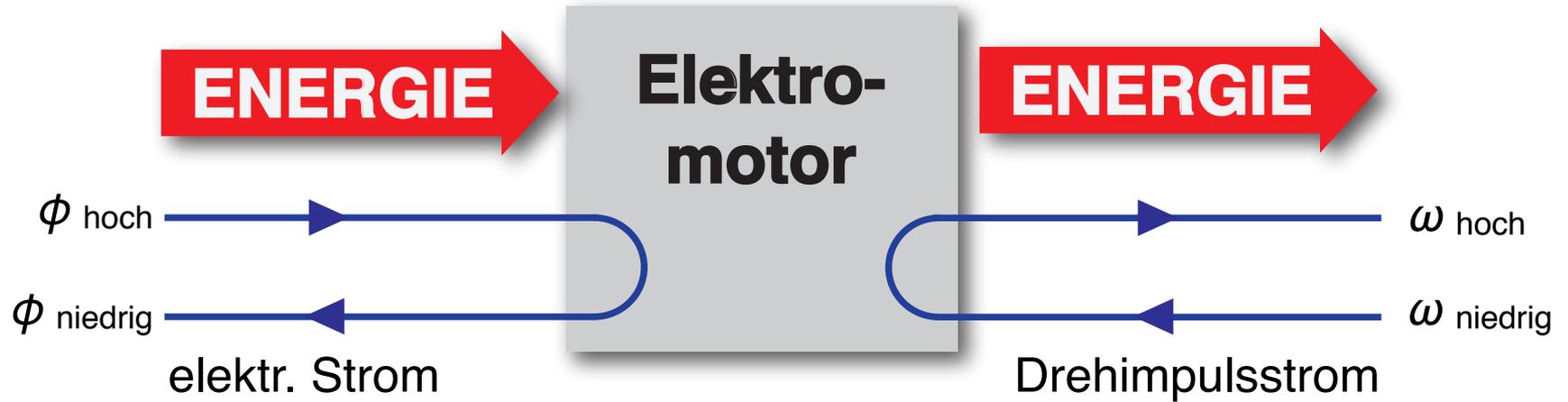
Unterricht:

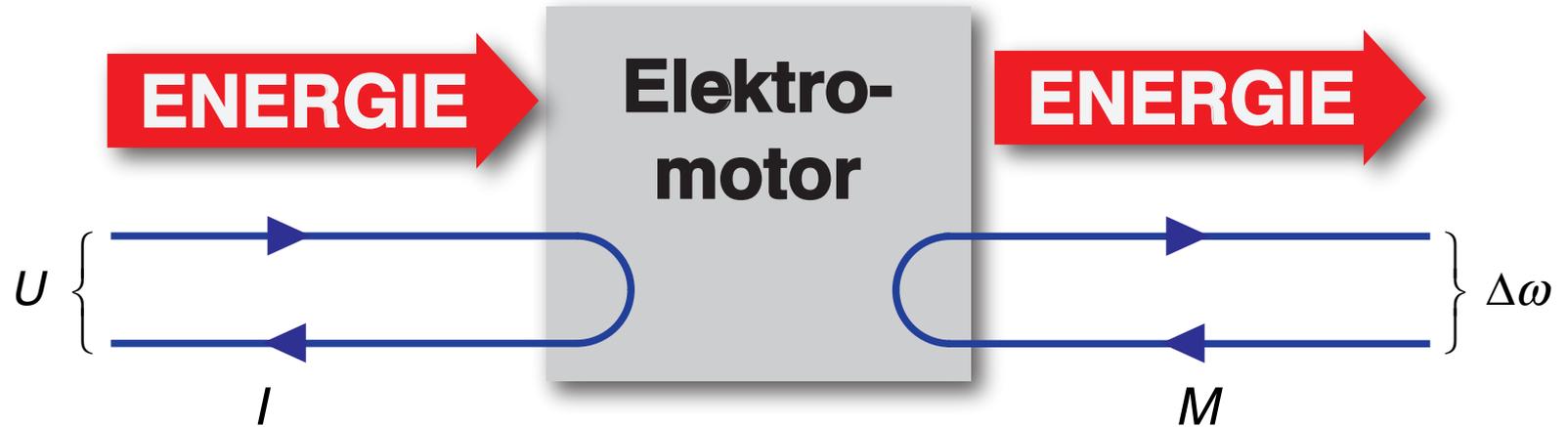
Frage immer nach dem Weg der Energie, und
beantworte die Frage.



Der elektrische Transformator

Andere Transformatoren



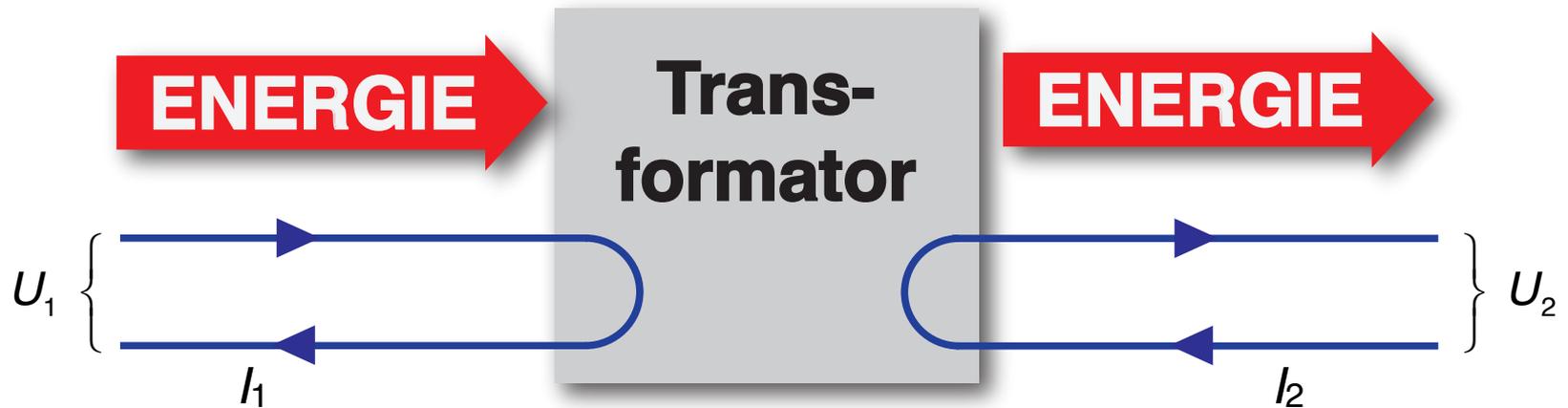


$$P = U \cdot I$$

$$P = \Delta\omega \cdot M$$

$$U \cdot I = \Delta\omega \cdot M$$



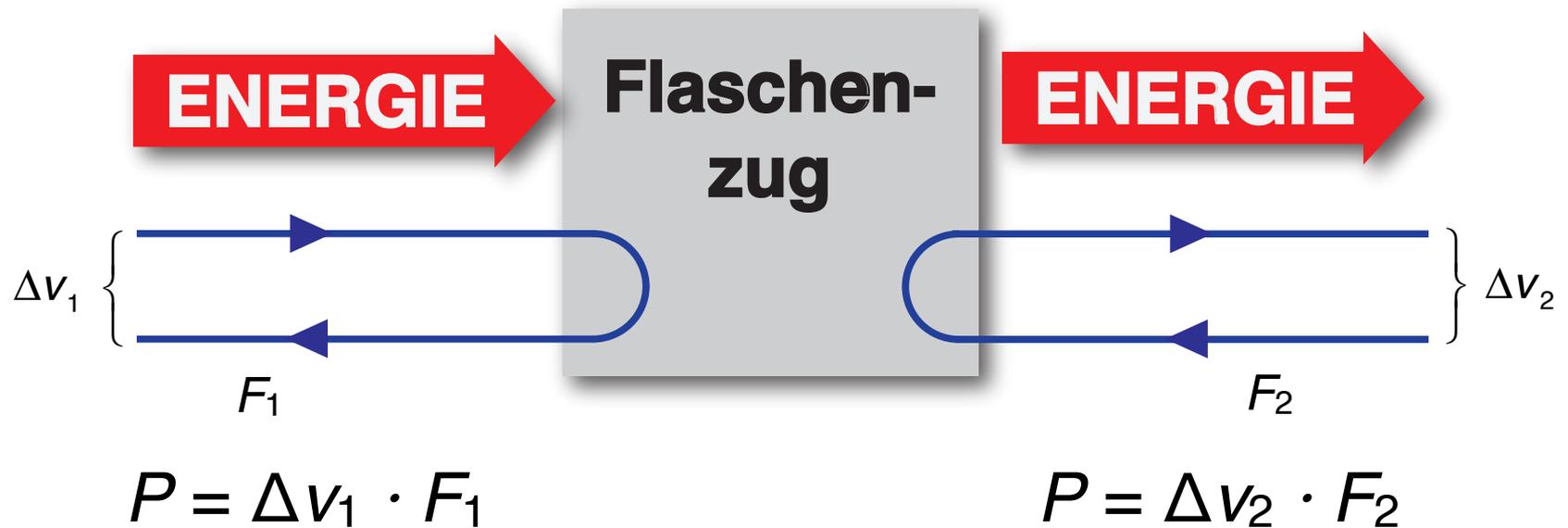


$$P = U_1 \cdot I_1$$

$$P = U_2 \cdot I_2$$

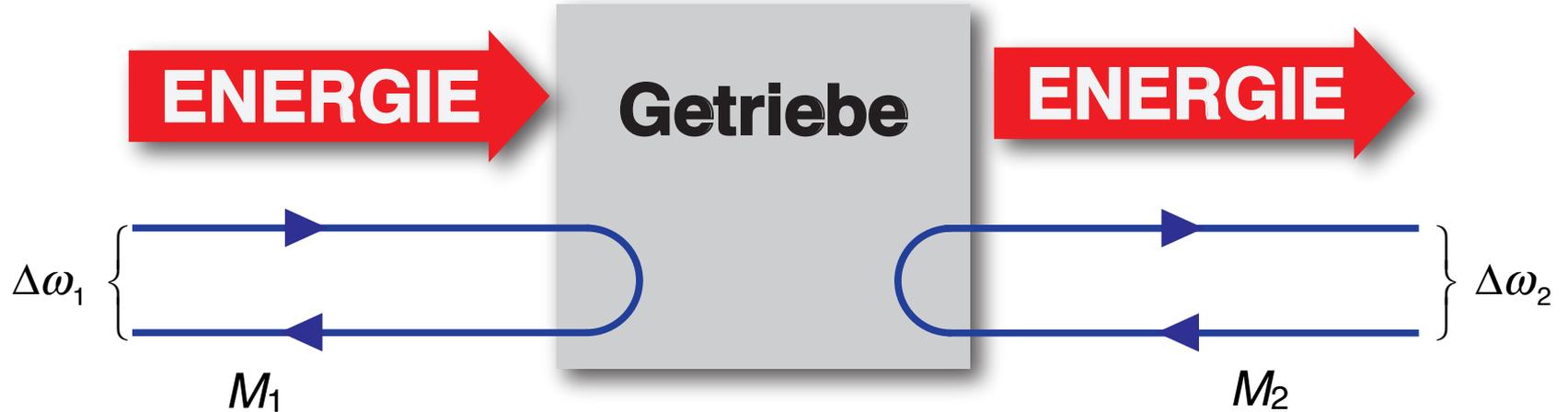
$$U_1 \cdot I_1 = U_2 \cdot I_2$$





$$\Delta v_1 \cdot F_1 = \Delta v_2 \cdot F_2$$

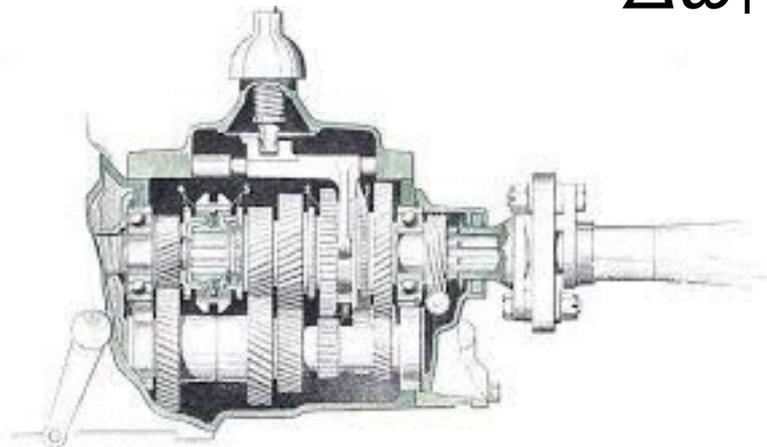


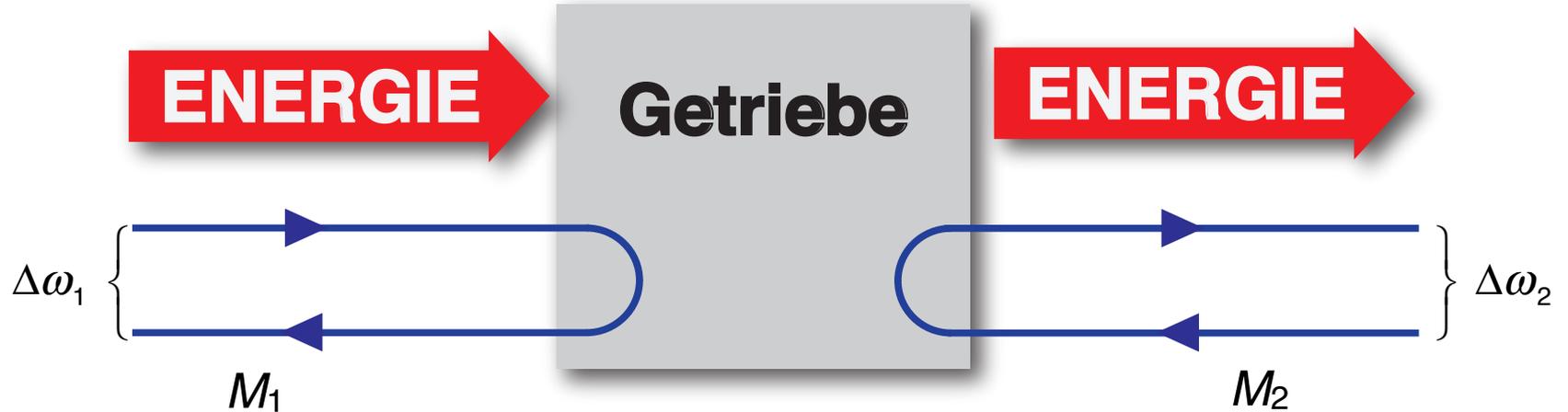


$$P = \Delta\omega_1 \cdot M_1$$

$$P = \Delta\omega_2 \cdot M_2$$

$$\Delta\omega_1 \cdot M_1 = \Delta\omega_2 \cdot M_2$$

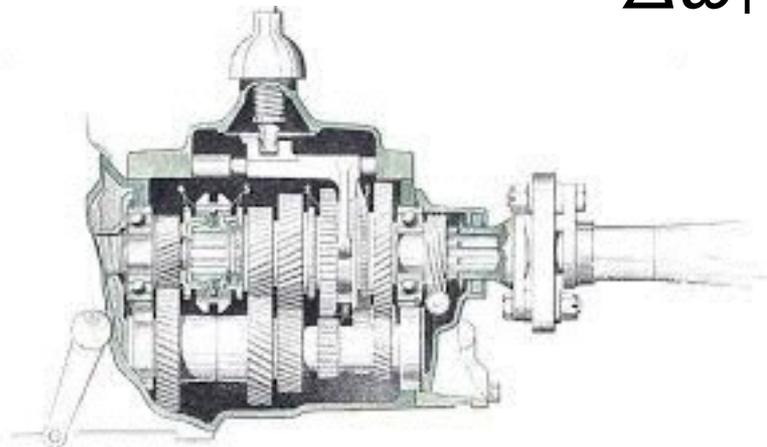




$$P = \Delta\omega_1 \cdot M_1$$

$$P = \Delta\omega_2 \cdot M_2$$

$$\Delta\omega_1 \cdot M_1 = \Delta\omega_2 \cdot M_2$$



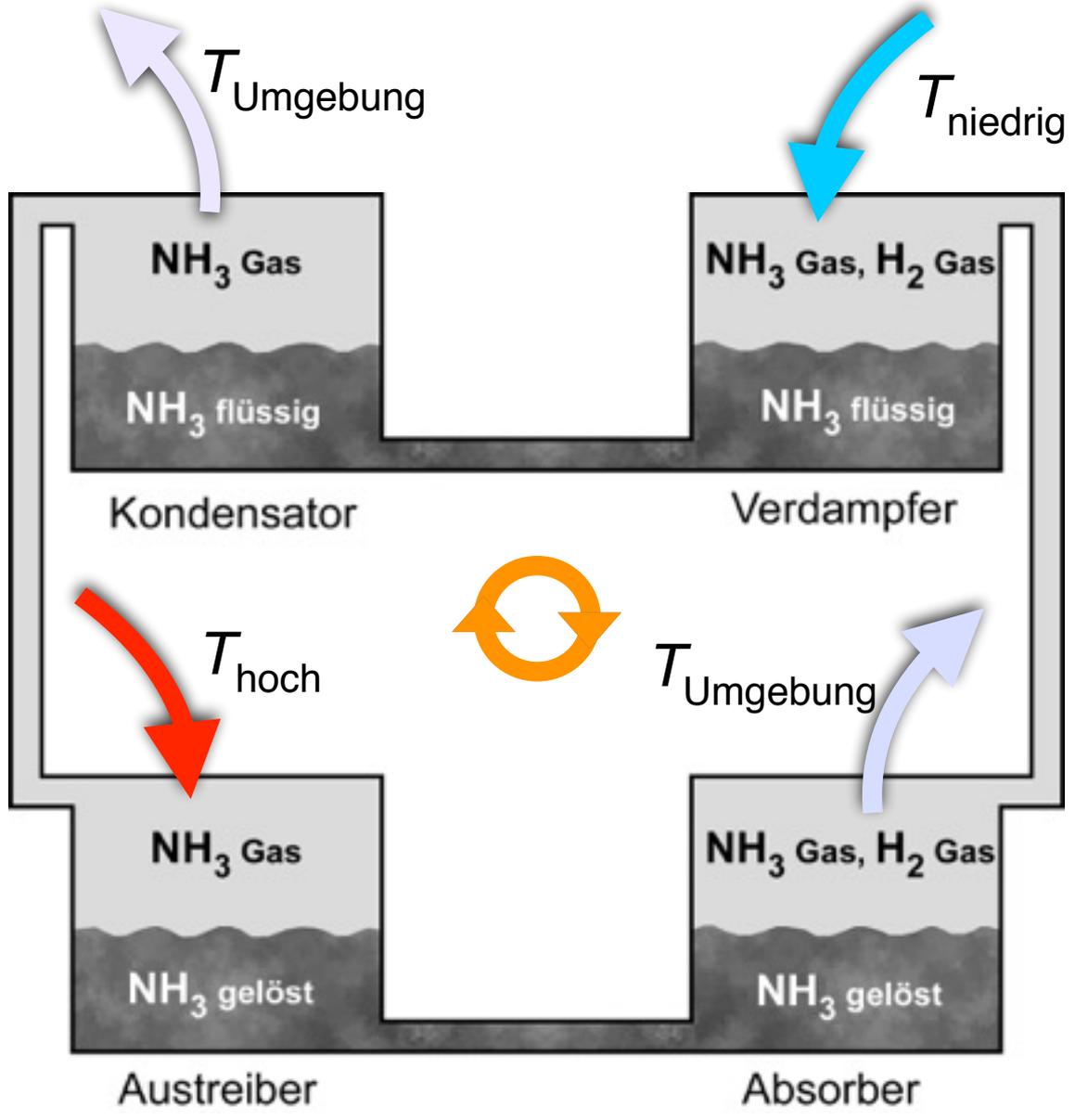
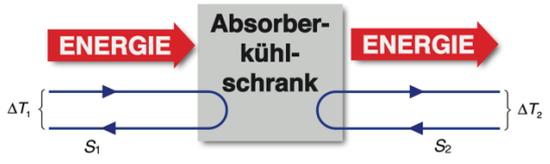


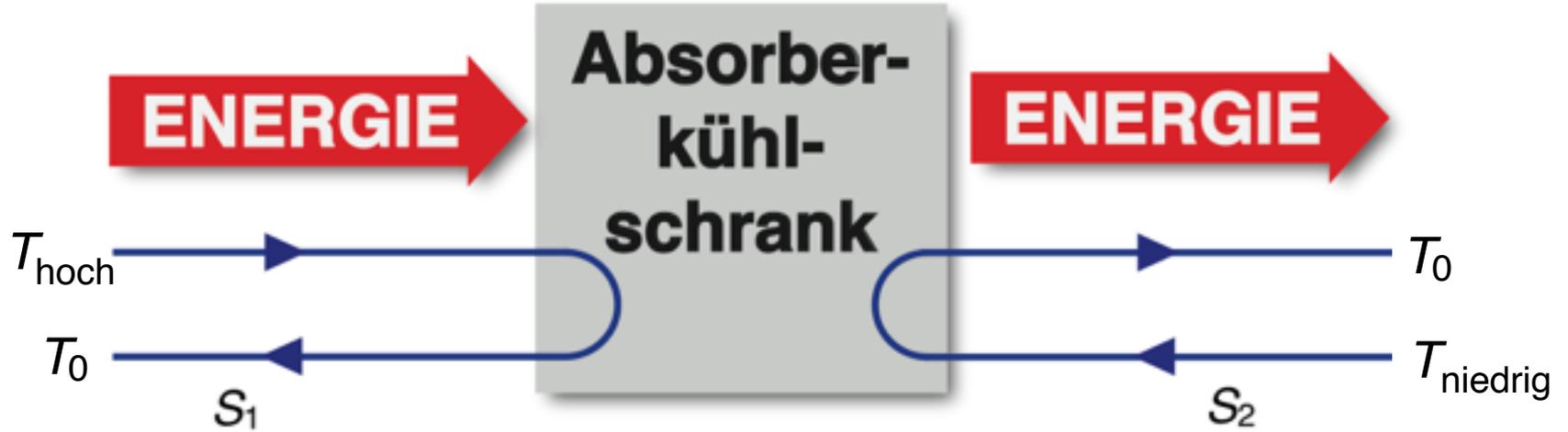
$$P = \Delta T_1 \cdot I_{S1}$$

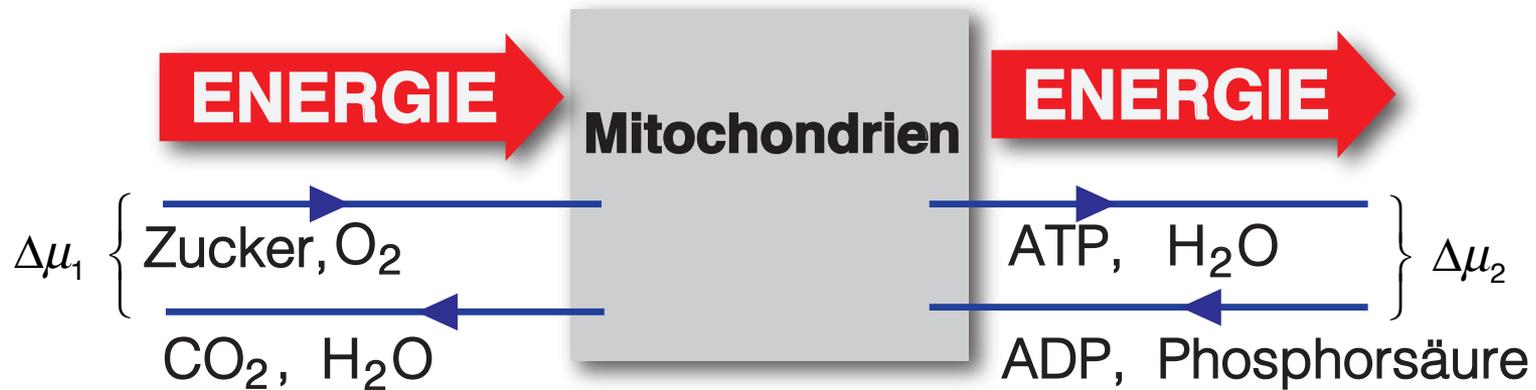
$$P = \Delta T_2 \cdot I_{S2}$$

$$\Delta T_1 \cdot I_{S1} = \Delta T_2 \cdot I_{S2}$$





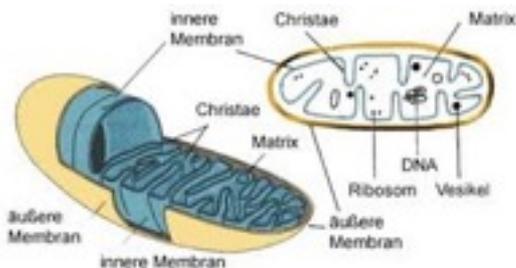


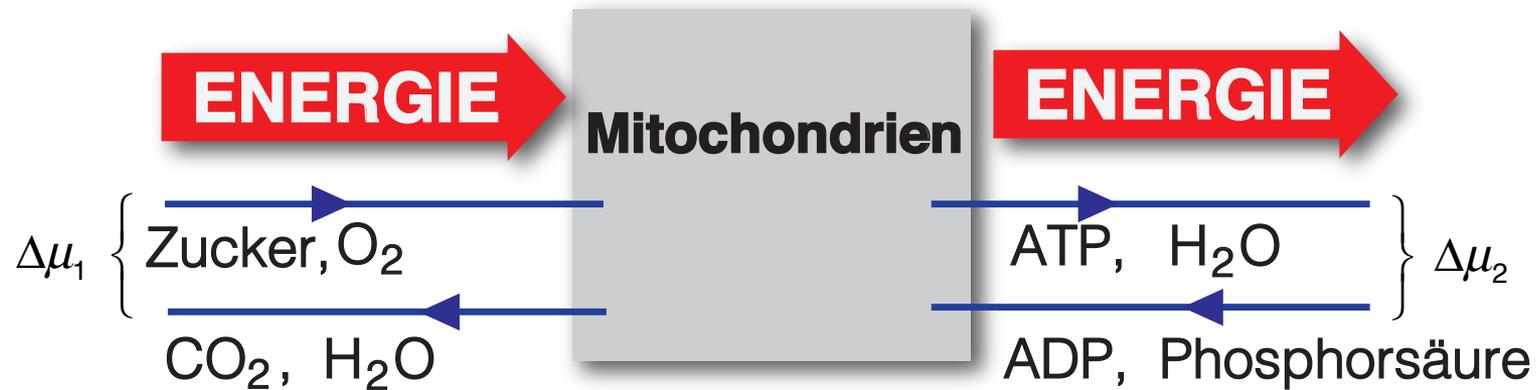


$$P = \Delta\mu_1 \cdot I_{n1}$$

$$P = \Delta\mu_2 \cdot I_{n2}$$

$$\Delta\mu_1 \cdot I_{n1} = \Delta\mu_2 \cdot I_{n2}$$





Unterricht:

Zeige allgemeine Strukturen, Ähnlichkeiten, Analogien auf.

