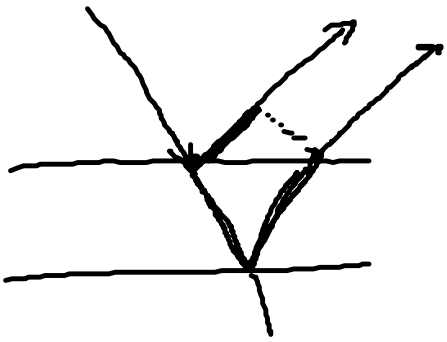
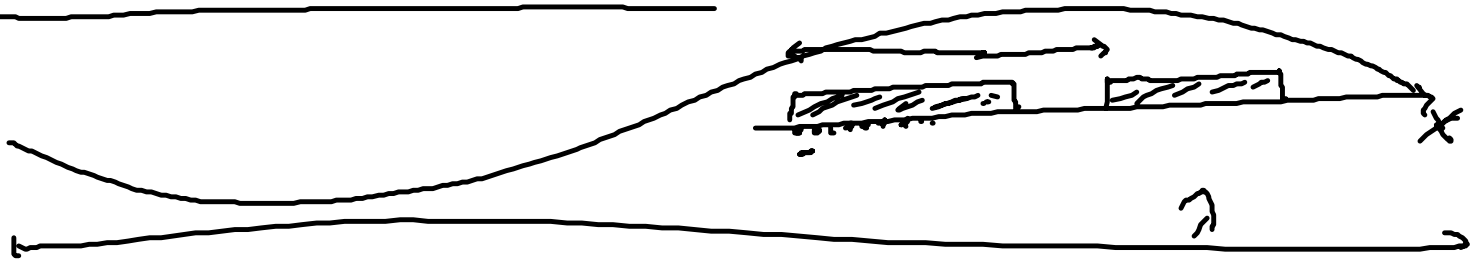
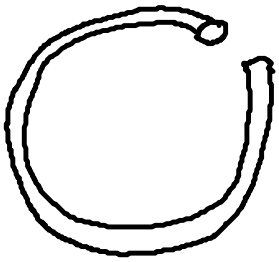
# 1.4 Elm. Wellen an Grenzflächen

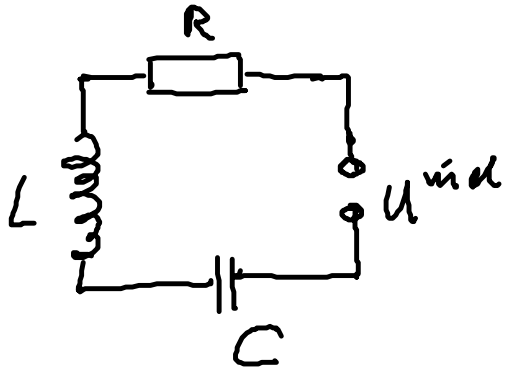


# 1.5 Metamaterialien









Mechanik $m\ddot{x} + \beta\dot{x} + cx = F\cos\omega t$

$\ddot{x} + \frac{\omega_0}{Q}\dot{x} + \omega_0^2 x = \frac{F}{m}\cos\omega t, \quad \omega_0^2 = \frac{c}{m}, \quad Q = \frac{m\omega_0}{\beta}$

$\omega_R = \omega_0\sqrt{1 - \frac{1}{2Q^2}}$, $Q$ = Güte

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$L\ddot{I} + R\dot{I} + \frac{1}{C}I = \dot{U}^{ind}$

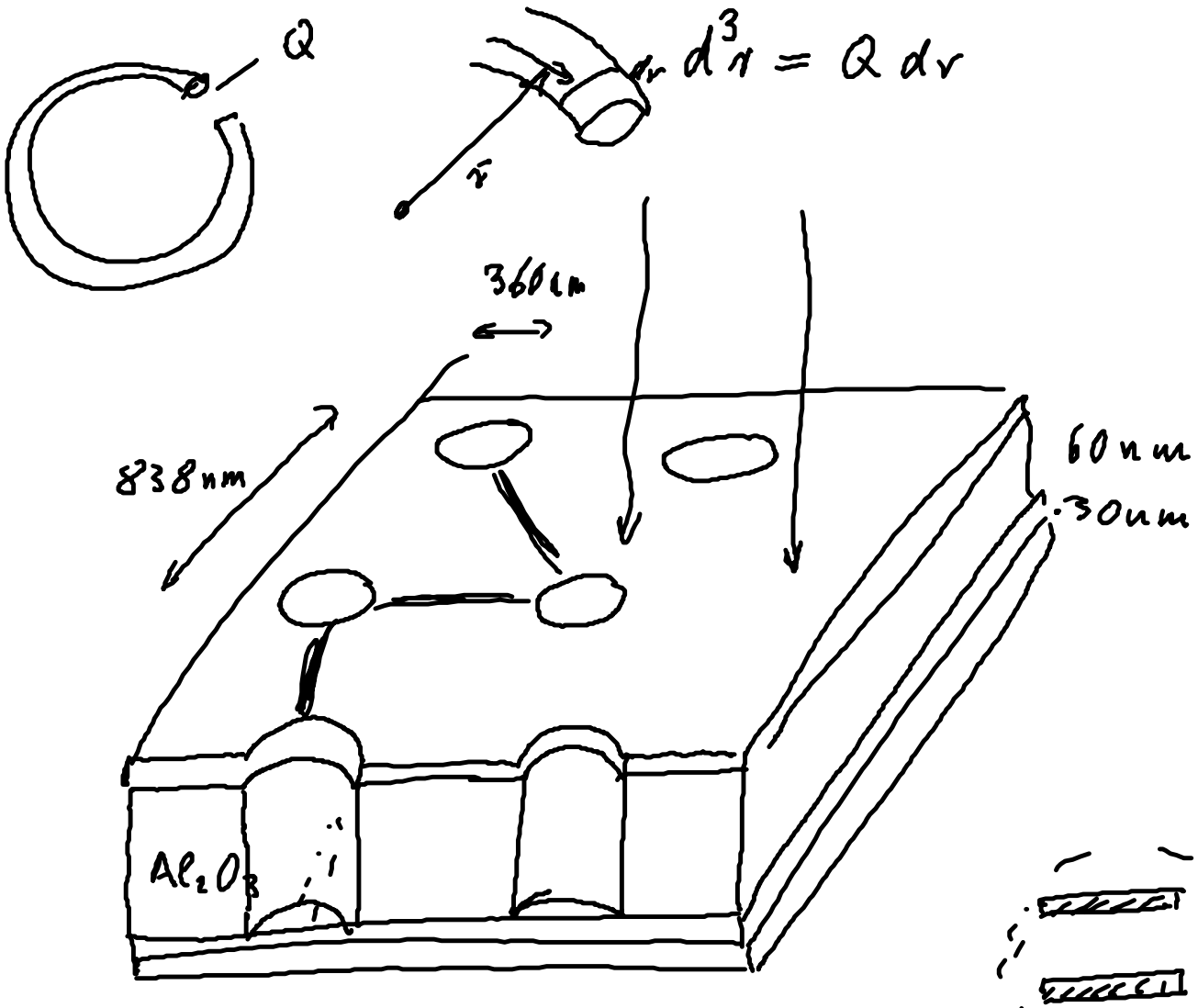
$[L] = \frac{Vs}{A}, \quad [R] = \frac{V}{A}$

$[C] = \frac{As}{V}, \quad [U^{ind}] = V$

$\ddot{I} + \frac{R}{L}\dot{I} + \frac{1}{LC}I = \frac{1}{L}\dot{U}^{ind} \Rightarrow \omega_0^2 = \frac{1}{LC}, \quad Q = \frac{\omega_0 L}{R}$

$\omega_R = \frac{1}{\sqrt{LC}}\sqrt{1 - \frac{R^2C}{2L}} = \frac{1}{\sqrt{LC}}\sqrt{1 - \frac{1}{2}}$ ~~$= \frac{1}{\sqrt{LC}}\sqrt{1 - \frac{1}{2}}$~~

$Q = \sqrt{\frac{L}{R^2C}}$




Saphir