

## Spannung und Potential

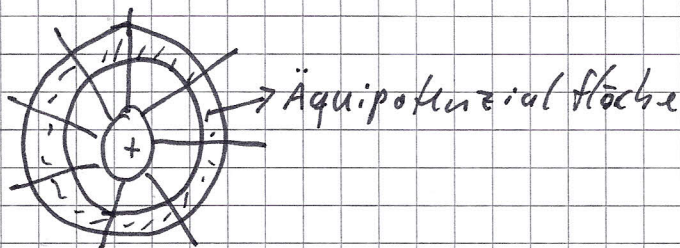
$$U_{AB} = \frac{W_{AB}}{Q} = \frac{Q}{Q} \int_A^B \vec{E} \, d\vec{s}$$

$$U_{AB} = \int_A^B \vec{E} \, d\vec{s} \quad \left| \vec{E} = \frac{Q}{4\pi\epsilon r} \left( \frac{\vec{r}}{r} \right) \right| \quad d\vec{s} = d\vec{r} + d\vec{r}_\perp$$

$$U_{AB} = \int_A^B \underbrace{\vec{E} \, d\vec{r}}_{\neq 0} + \int_A^B \vec{E} \, d\vec{r}_\perp$$

$$U_{AB} = \int_A^B \vec{E} \, d\vec{r} = \frac{Q}{4\pi\epsilon} \int_A^B \frac{1}{r^2} \, dr = \frac{Q}{4\pi\epsilon} \left( \frac{1}{-r} \right) \Big|_A^B$$

$$U_{AB} = \frac{Q}{4\pi\epsilon} \left( \frac{1}{r_A} - \frac{1}{r_B} \right)$$



$$\oint \vec{E} \, d\vec{s} = 0 \rightarrow \text{Maschensatz}$$