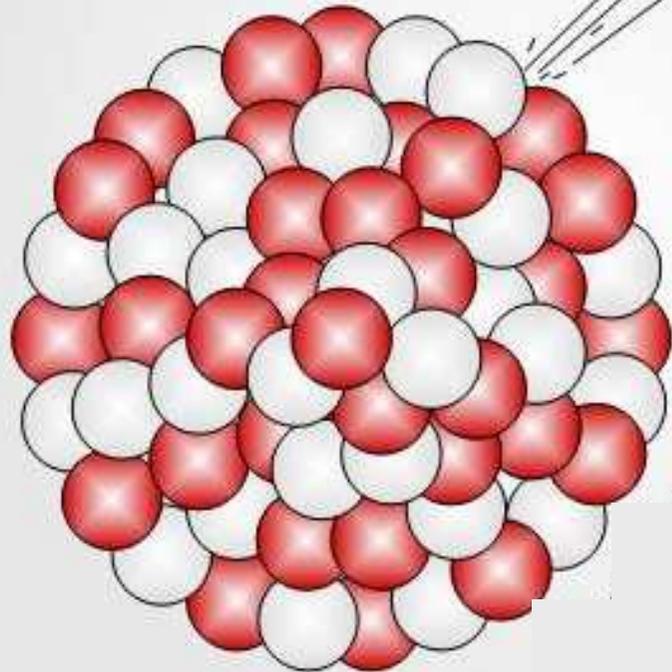




Der Beta-Minus Zerfall

Beta-
Strahlung



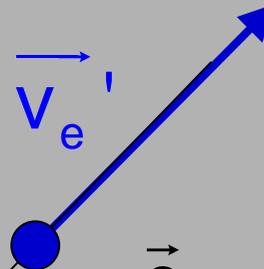
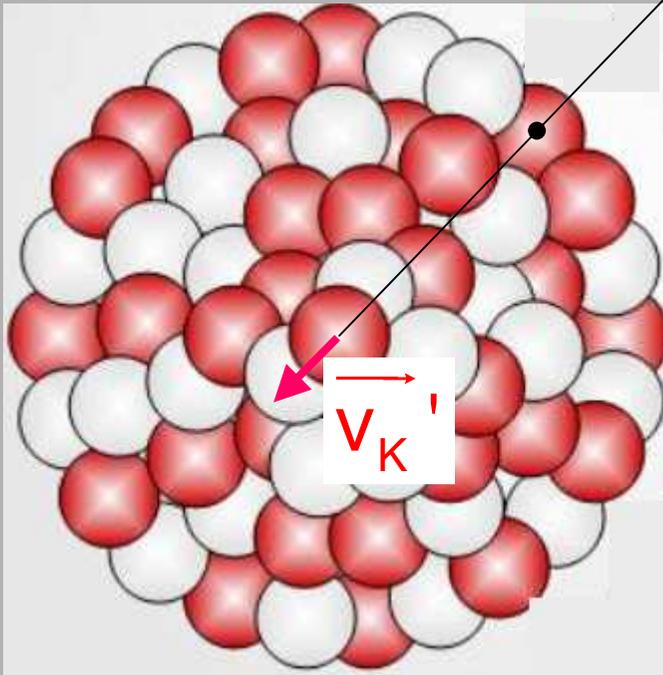
e^{-}

Wie kann
das sein?



Der Beta-Zerfall

Impulserhaltung



$$\vec{P} = \vec{P}'$$

$$\vec{0} = \vec{P}_e' + \vec{P}_K' \Rightarrow \vec{P}_e' = -\vec{P}_K'$$

$$\vec{0} = m_e \cdot \vec{v}_e' + m_K \cdot \vec{v}_K'$$

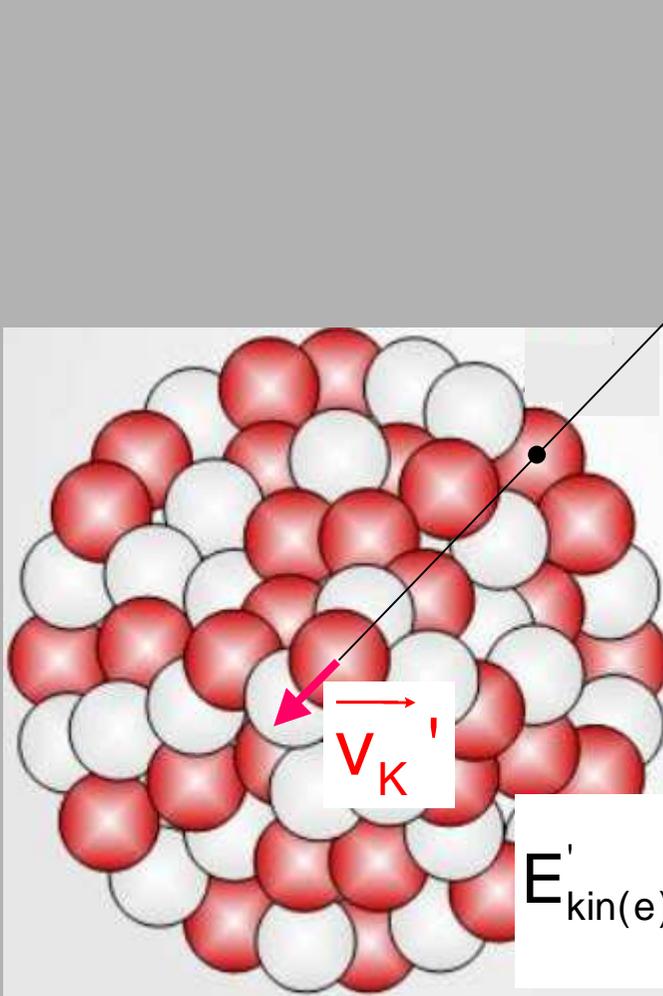
$$\vec{v}_e' = -\frac{m_K}{m_e} \cdot \vec{v}_K'$$

$$E'_{\text{kin}(e)} = \frac{(p_e')^2}{2m_e}$$

$$E'_{\text{kin}(K)} = \frac{(p_K')^2}{2m_K}$$



Der Beta-Zerfall Energieerhaltung



$$E'_{\text{kin}(e)} + E'_{\text{kin}(K)} = E_0$$

$$E'_{\text{kin}(e)} = \frac{(p_e')^2}{2m_e} \quad E'_{\text{kin}(K)} = \frac{(p_K')^2}{2m_K}$$

$$E'_{\text{kin}(K)} = \frac{(p_e')^2}{2m_K}$$

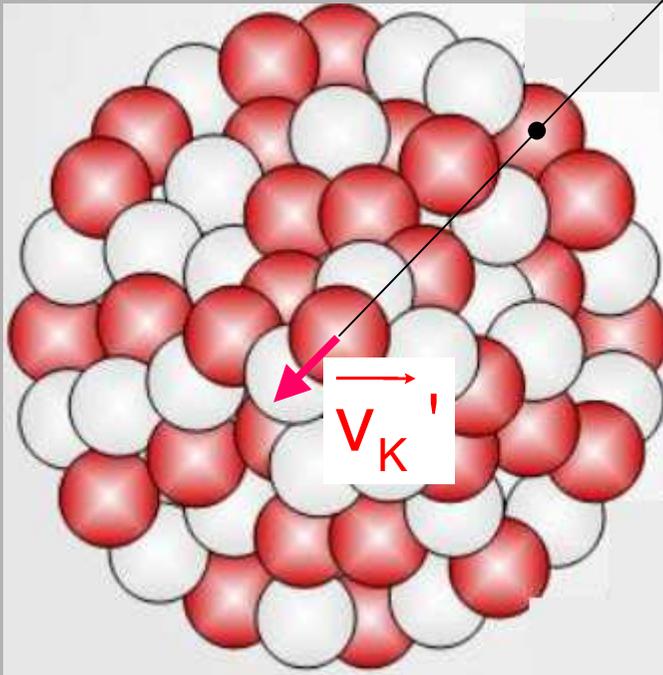
$$\frac{E'_{\text{kin}(e)}}{E'_{\text{kin}(K)}} = \frac{m_K}{m_e}$$

$$E'_{\text{kin}(e)} + \frac{m_e}{m_K} E'_{\text{kin}(e)} = E_0$$

$$E'_{\text{kin}(e)} = \frac{m_K}{m_e + m_K} E_0$$



Der Beta-Zerfall Energieerhaltung



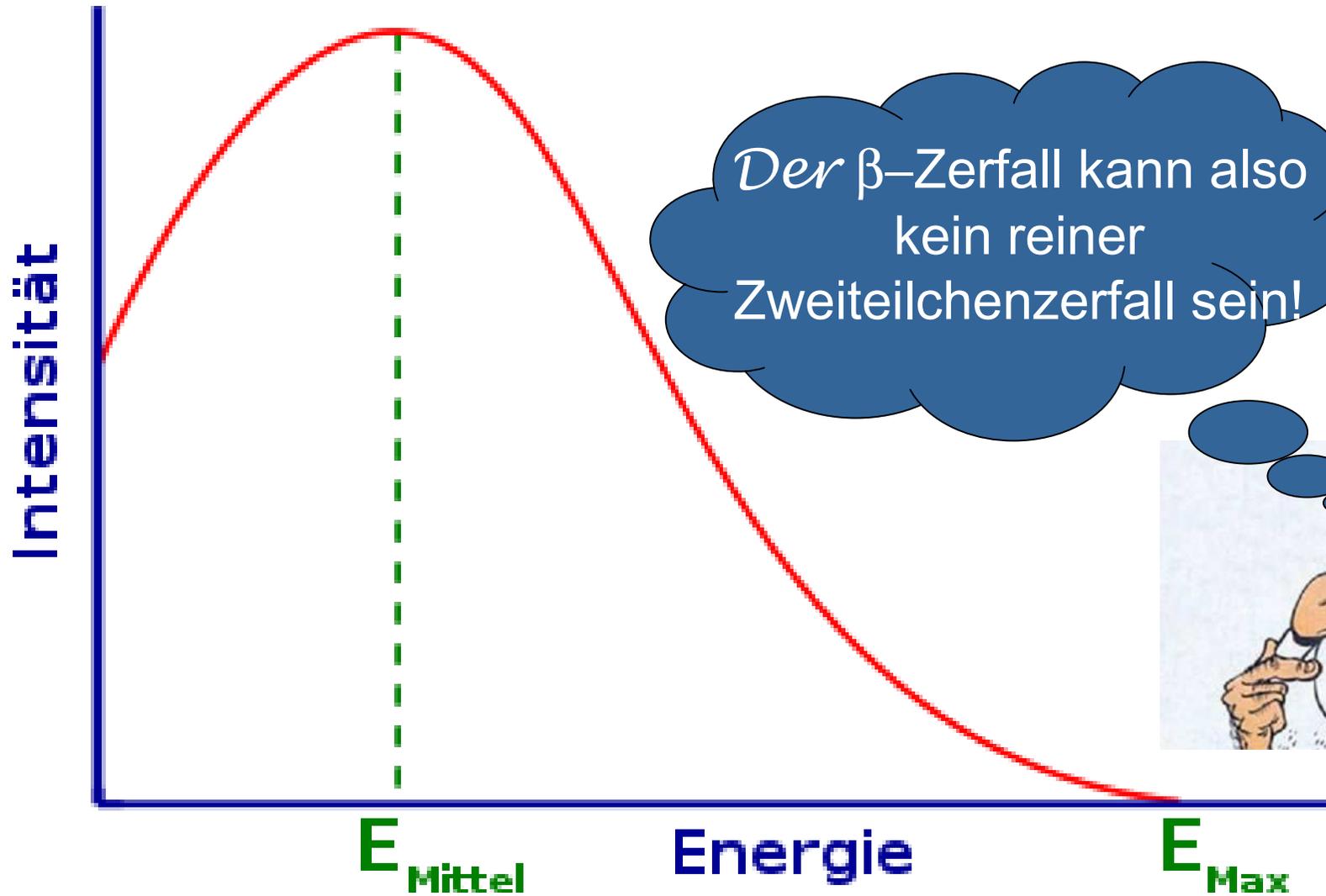
$$E'_{\text{kin}(e)} = \frac{m_K}{m_e + m_K} E_0$$

Die Elektronen
müssten als immer
die gleiche Energie
haben!





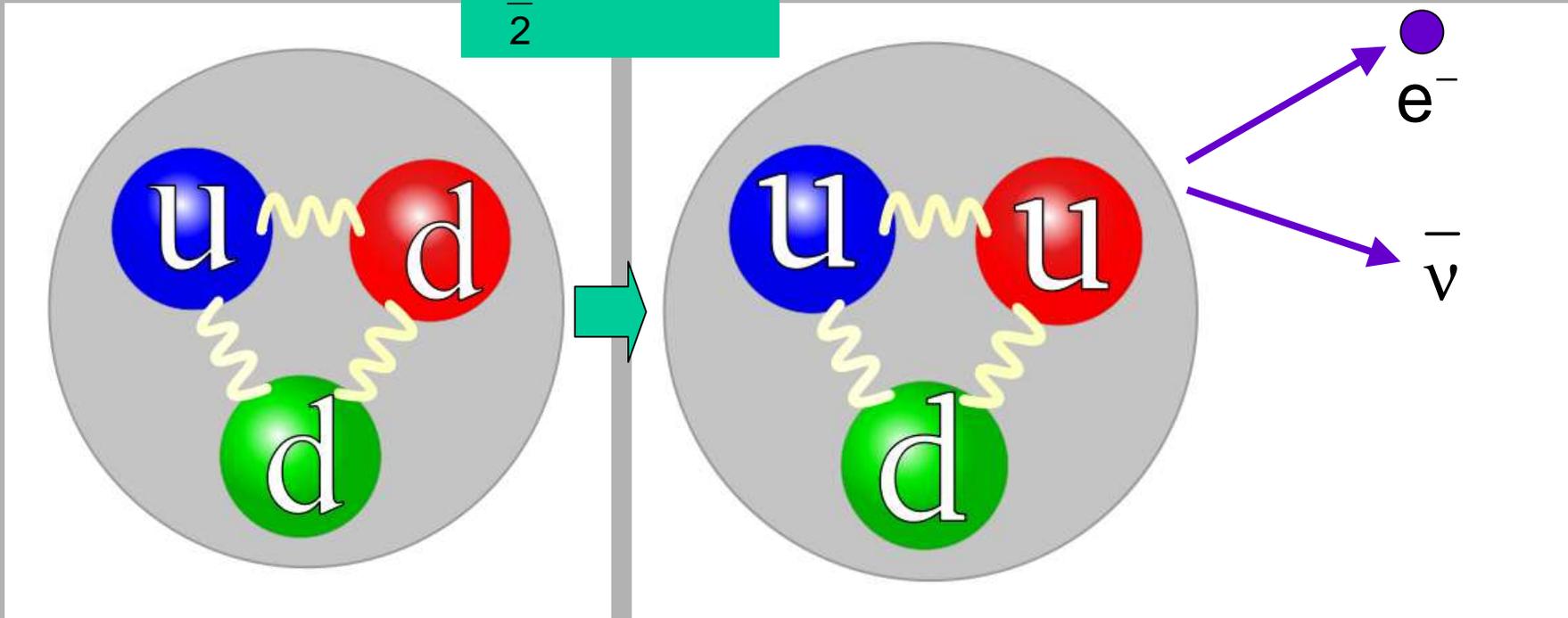
Das Spektrum der β -Strahlung





Der Neutronenzerfall (freie Neutronen)

$$T_{\frac{1}{2}} \approx 886 \text{ s}$$





PROGRAMM
Steigerung der Effizienz des
mathematisch-naturwissenschaftlichen
Unterrichts

Cusanus-Gymnasium Wittlich

Physik – Kernphysik Fachlehrer : *W. Zimmer*

