

$$T = 570 \text{ MeV}$$

$$m_p c^2 = 938 \text{ MeV}$$

$$N = ?$$

$$p = ?$$

$$\lambda_{dB} = ?$$

$$N_{NR} = ?$$

RELAT. DISPERZNI VETAH

$$E^2 = p^2 c^2 + m^2 c^4$$

$$(m c^2 + T)^2 = p^2 c^2 + m^2 c^4$$

$$m^2 c^4 + 2 m c^2 T + T^2 = p^2 c^2 + m^2 c^4$$

$$2 m c^2 T + T^2 = p^2 c^2$$

$$\sqrt{2 m c^2 T + T^2} = p c$$

$$\rightarrow p c = \sqrt{2 \cdot 938 \cdot 570 + 570^2} = 1180,8 \text{ MeV}$$

$$\rightarrow \underline{p = 1180,8 \frac{\text{MeV}}{c}}$$

$$\frac{N}{c} = \beta = \frac{p c}{E} = \frac{p c}{m c^2 + T}$$

$$\frac{N}{c} = \frac{1180,8 \text{ MeV}}{938 \text{ MeV} + 570 \text{ MeV}} = 0,783$$

$$\rightarrow \underline{N = 0,783 c}$$

$$E = \gamma m c^2$$

$$p = \gamma m v \rightarrow \beta = \frac{p c}{E}$$

$$\frac{E}{m c^2} = \frac{p}{m v}$$

$$\underline{\lambda_{dB} = \frac{h}{p} = \frac{2\pi \hbar}{p} = \frac{2\pi \hbar}{p} \frac{c}{c} = \frac{2\pi}{p c} \overbrace{\hbar c}^{197 \text{ MeV} \cdot \text{fm}} = \frac{2\pi}{1180,8} 197 = 1,05 \text{ fm}}$$

$$T = \frac{1}{2} m N_{NR}^2$$

$$N_{NR}^2 = \frac{2 T}{m} \frac{c^2}{c^2}$$

$$N_{NR} = c \sqrt{\frac{2 T}{m c^2}} = \sqrt{\frac{2 \cdot 570}{938}} c = 1,1 c = \underline{N_{NR}}$$