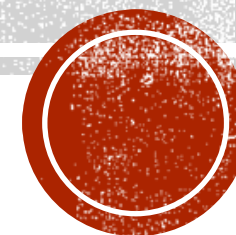
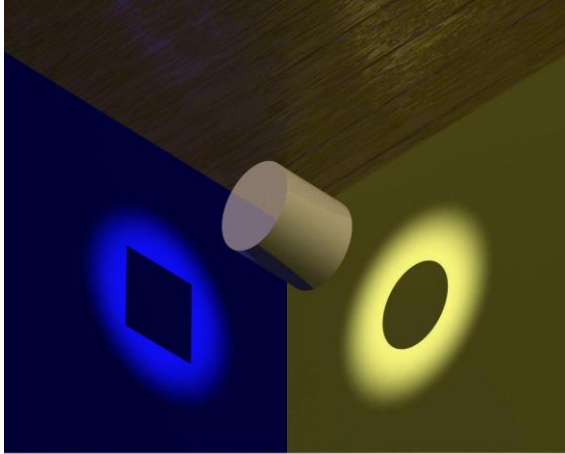


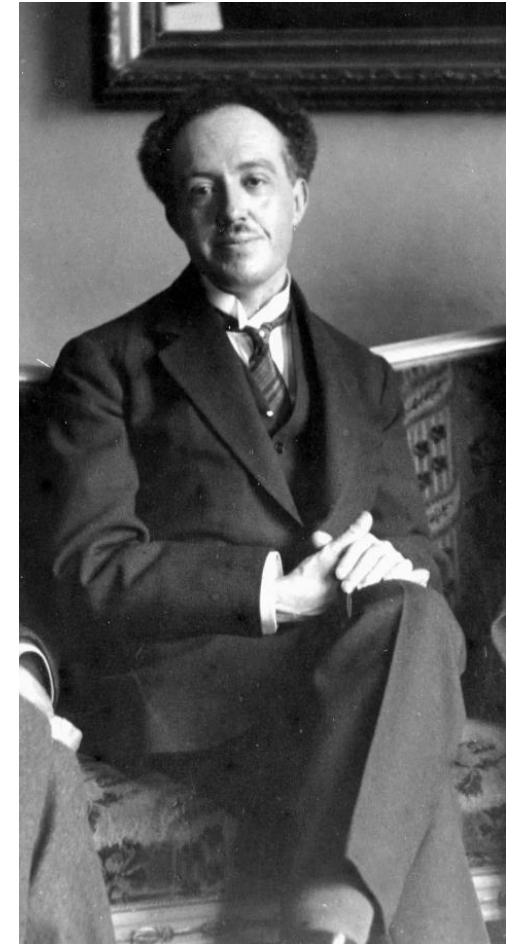
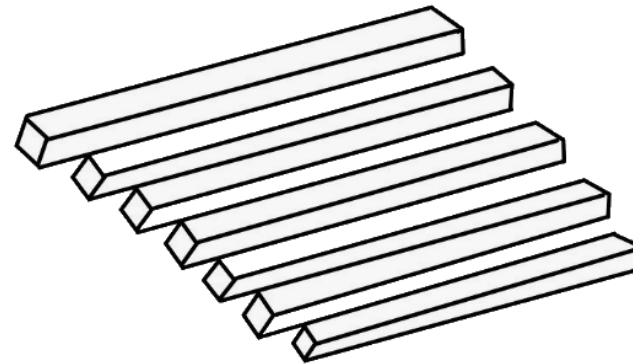
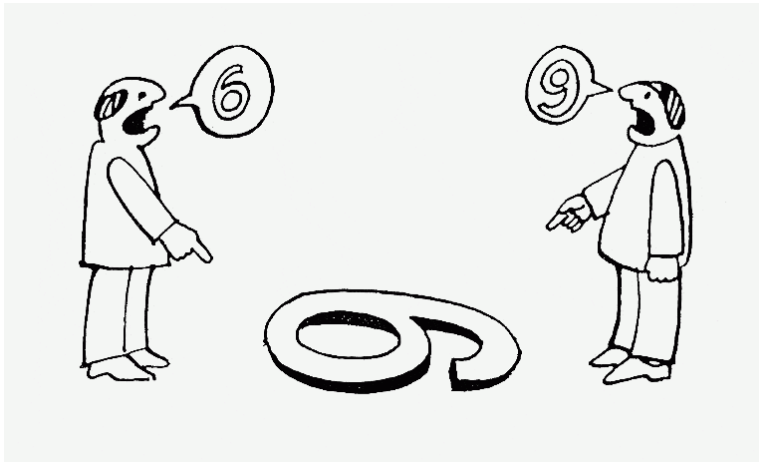
AZ ANYAGHULLÁM



Az anyag kettős természetete



- Az elektron és minden részecske is hullámtermészetet is tud mutatni --> Anyaghullámok
- Csak állóhullámként lehetnek jelen



De Broglie-féle anyaghullám és atommodell

$$hf = mc^2$$

$$mc = \frac{hf}{c} = \frac{h}{\lambda}$$

$$p = mc$$

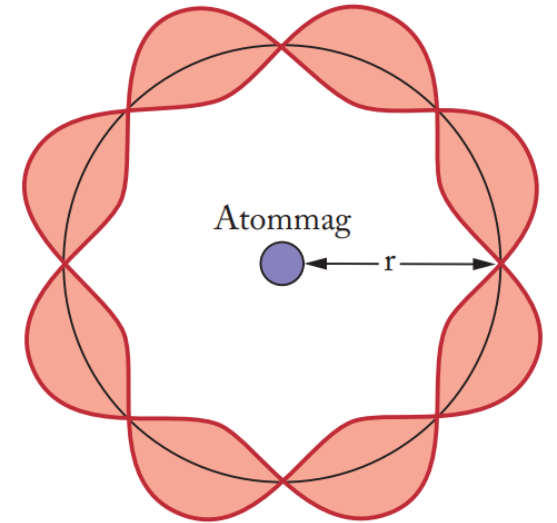
$$p = \frac{h}{\lambda}$$

$$m \cdot v \cdot r = n \cdot \frac{h}{2\pi}$$

$$2\pi \cdot r = n \cdot \frac{h}{m \cdot v} = n \cdot \frac{h}{p}$$

$$p = \frac{h \cdot f}{c} = \frac{h}{\lambda} \longrightarrow \lambda = \frac{h}{p}$$

$$2\pi \cdot r = n \cdot \lambda$$

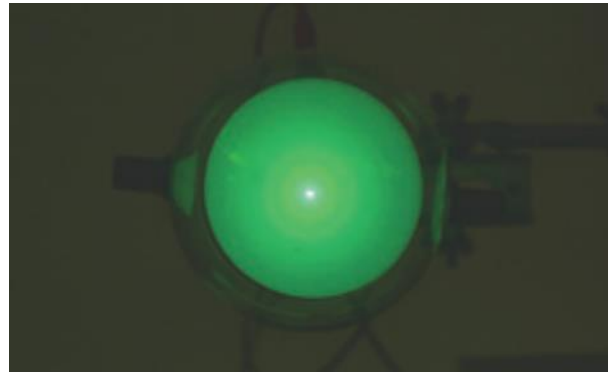
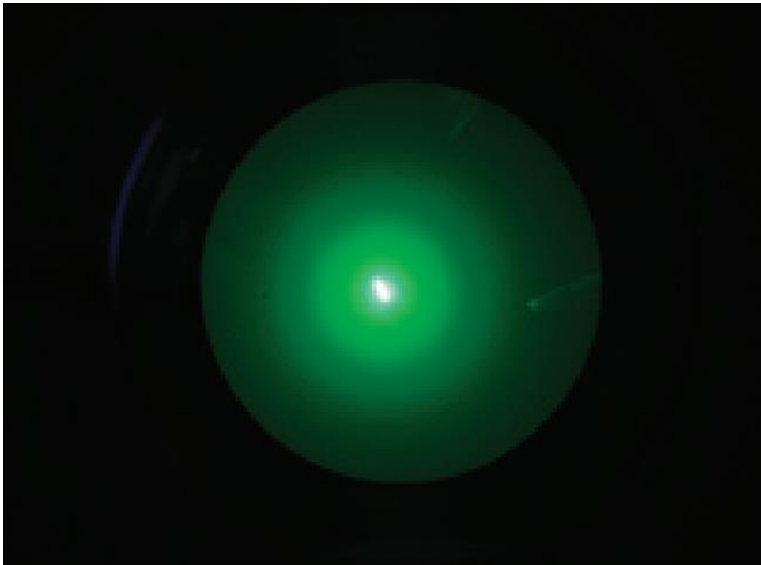


Davisson és Germer kísérlete

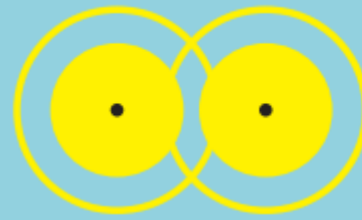
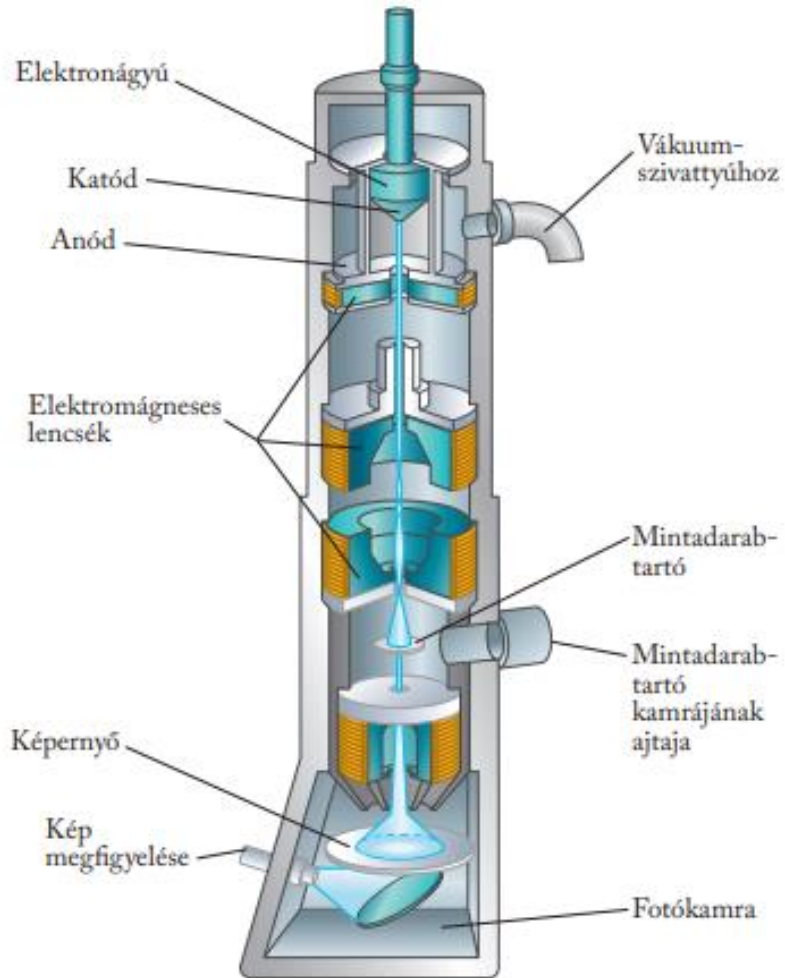


$$\frac{6.63 \cdot 10^{-34} \text{ Js}}{70 \text{ m/s} * 0.05 \text{ kg}} = 1.8942 \cdot 10^{-34} \text{ m}$$

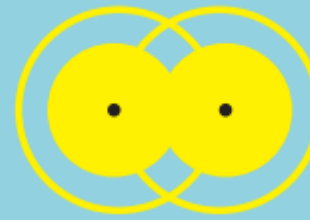
<https://youtu.be/Bm3v4lzfhwW?si=9q5tZfMxpbWmXAgA>



Elektronmikroszkóp



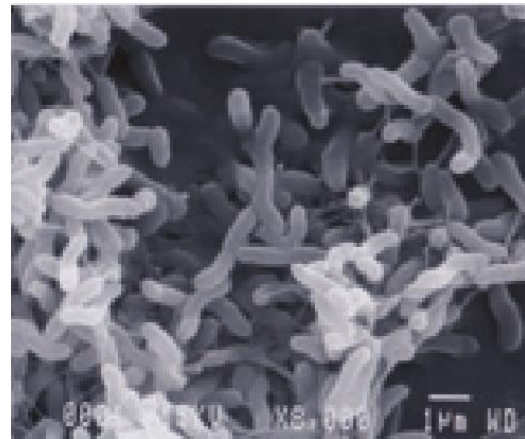
elkülöníthető



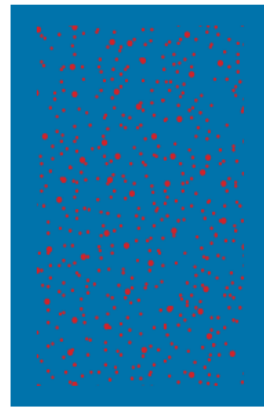
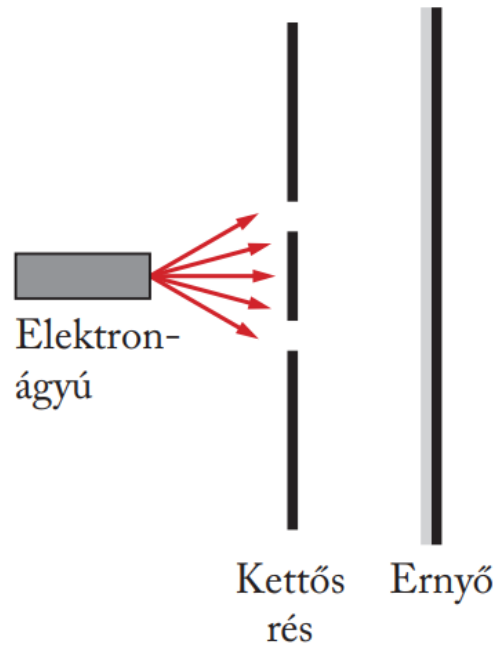
éppen
elkülöníthető



nem
különíthető el



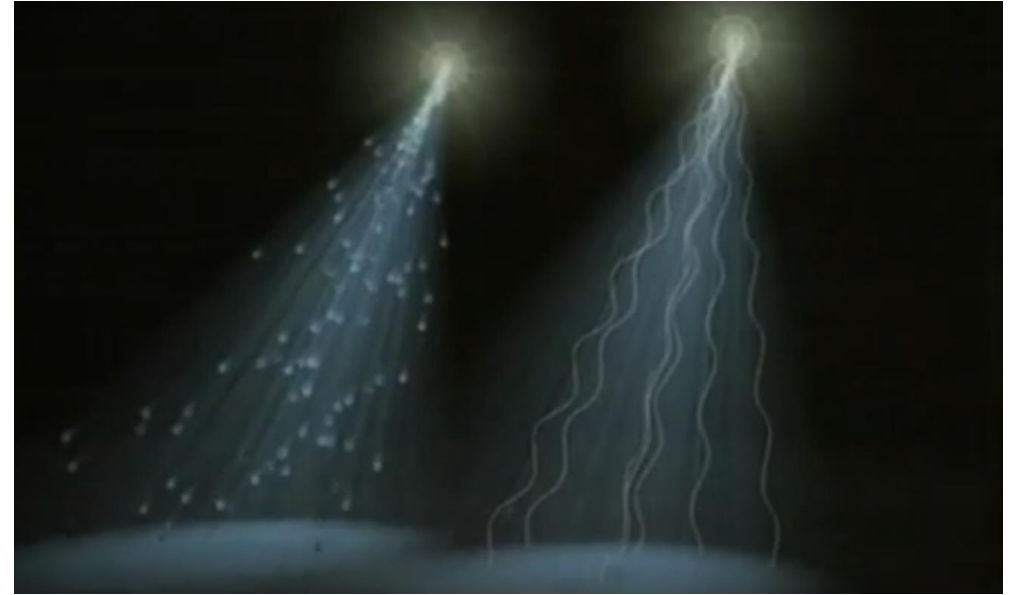
Young féle kísérlet



Ha felváltva nyitjuk ki a réseket, nincs interferencia

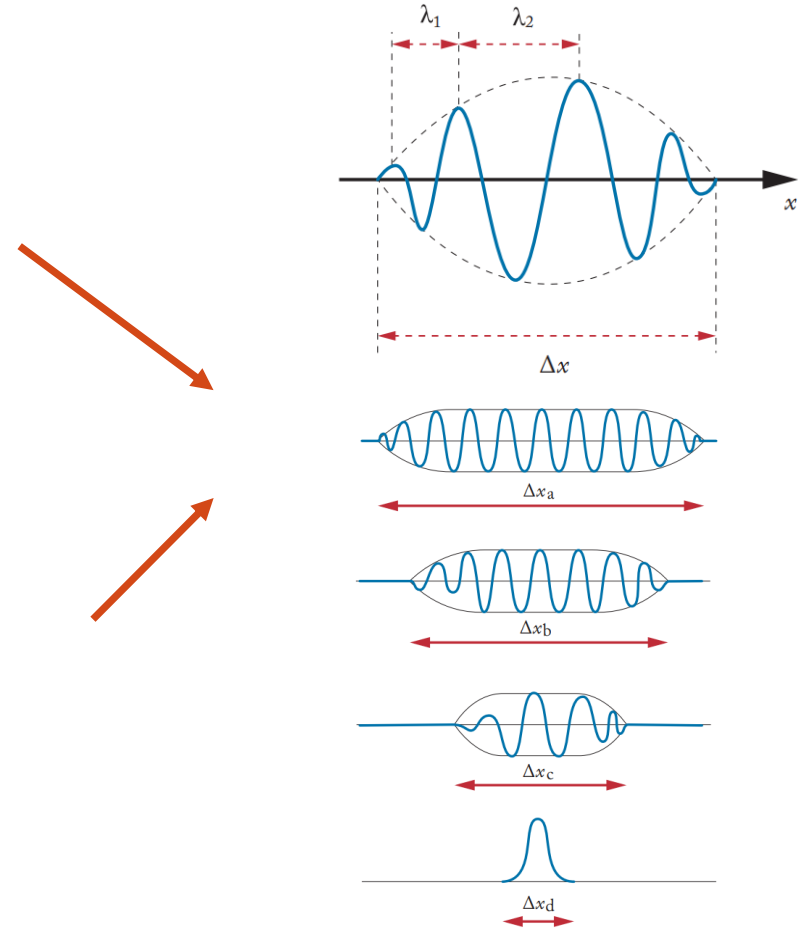
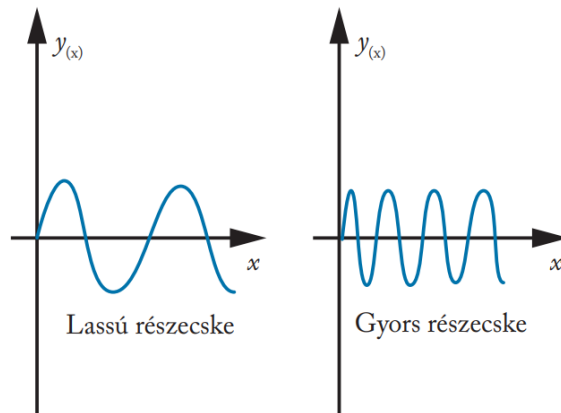
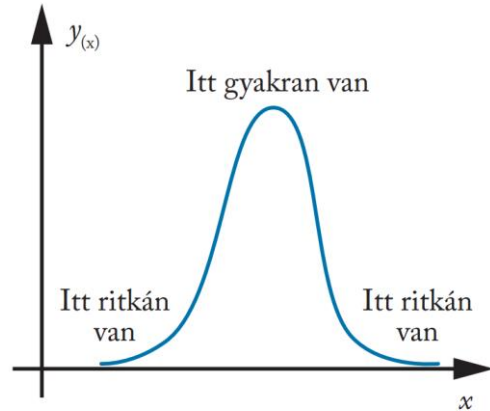
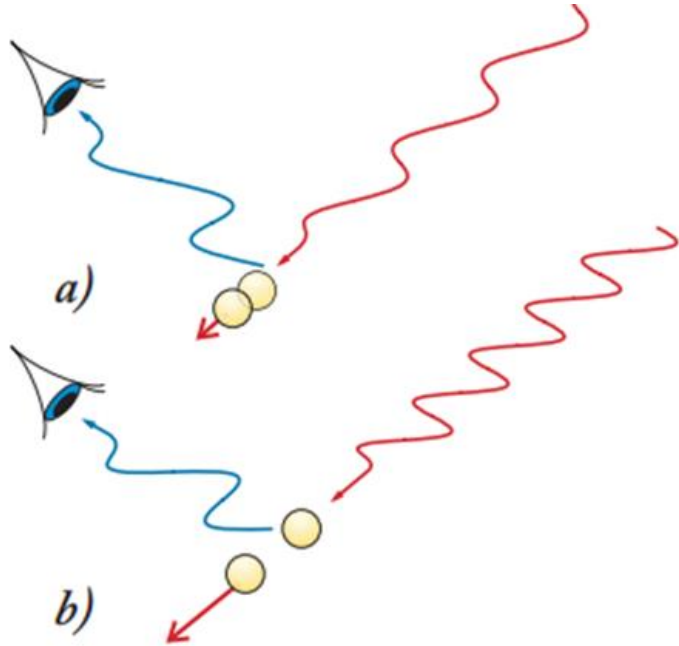


Ha mindkét rés egyszerre van nyitva, akkor van interferencia

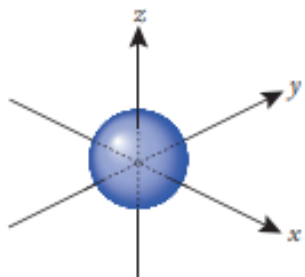


Heisenberg féle határozatlansági reláció

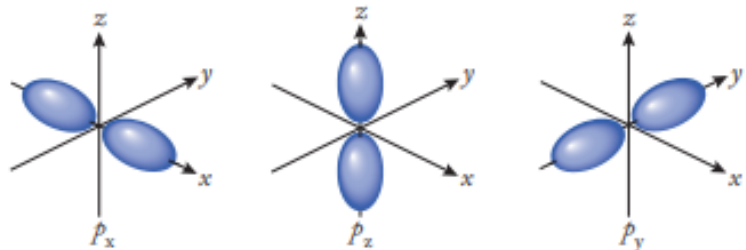
$$\Delta x \cdot \Delta p \geq \frac{h}{4\pi}$$



Periódusos rendszer:



Az s-pálya alakja



A p-pályák alakja

