20190226 motivation

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chapter zero motivation

① black body radiation, photon energy is "quantized"

$E = h \cdot \nu$

Planck's constant $h = 6.626\,070\,15$ J·s

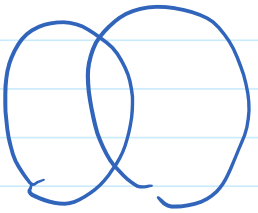
② photo electric effect.

③ particle wave $\lambda = \frac{h}{p}$

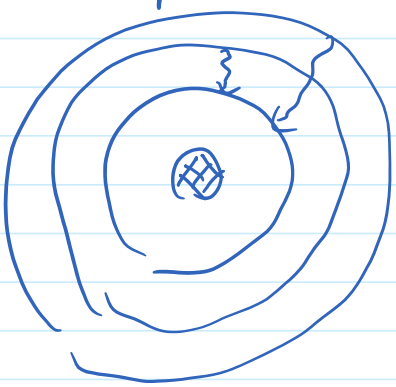
1eV e^-, $E = \frac{1}{2}mv^2 = \frac{p^2}{2m}$, $\lambda = 1.2$ nm

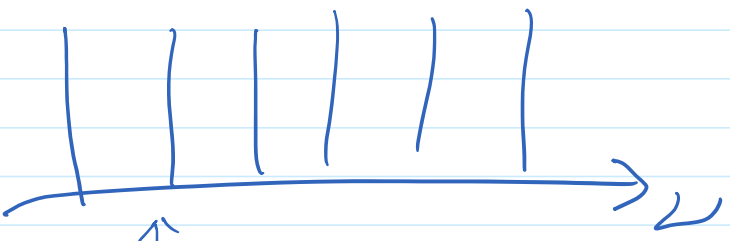
120 km/h → λ small

$\begin{cases} 170\ \text{nK}\ {}^{87}\text{Rb} & \lambda = \frac{h}{\sqrt{2\pi m k_B T}} \sim 450\ \text{nm} \\ n\lambda^3 > 2.6 \longrightarrow \text{BEC} \end{cases}$

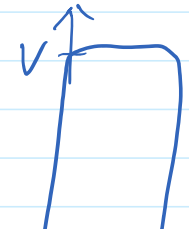


④ atomic spectra





⑤ tunneling



probability ≠ 0

⑤ tunneling