Vodikov „ion“

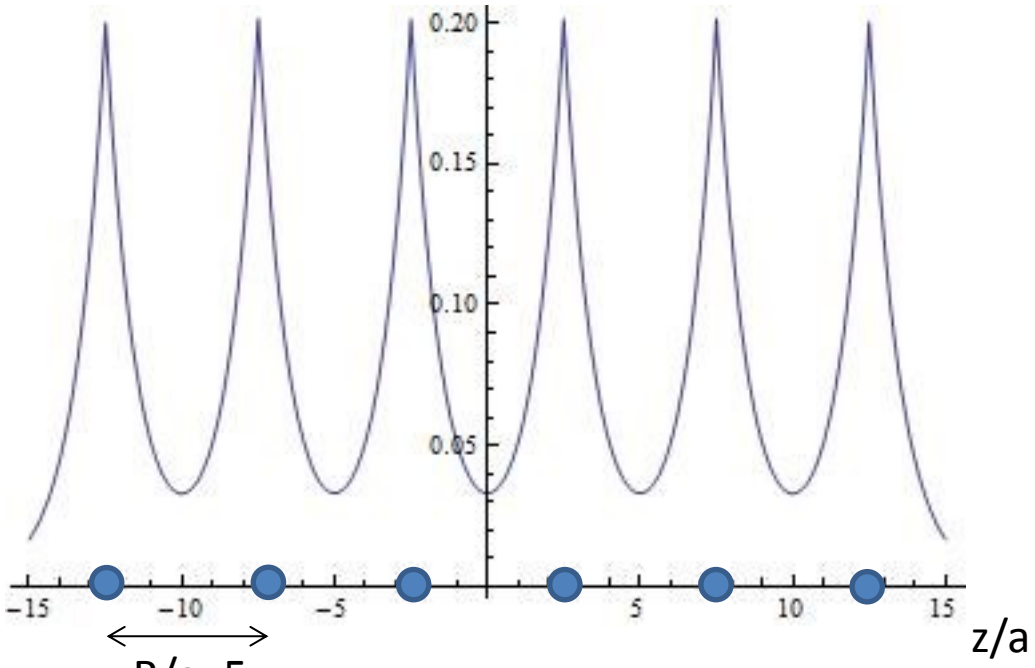
6 atomov vodika, 1 e^-;
val. f. e^- je vsota šestih val. f. vodikovega atoma (osnovno stanje)

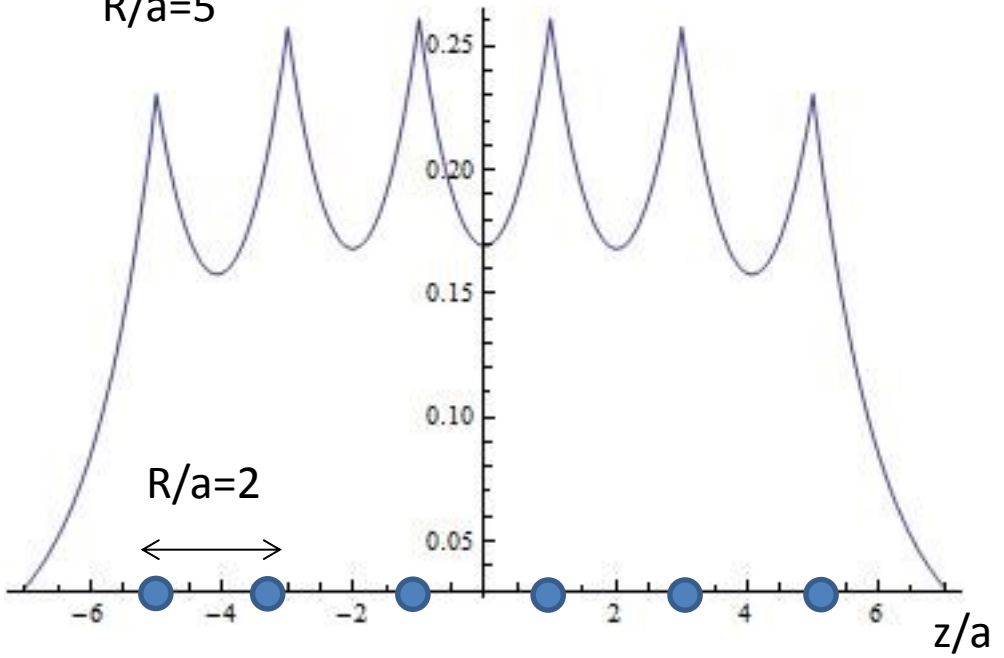
$$\psi_1(z) = \frac{1}{\sqrt{8\pi a^3}} e^{-|z|/a}$$

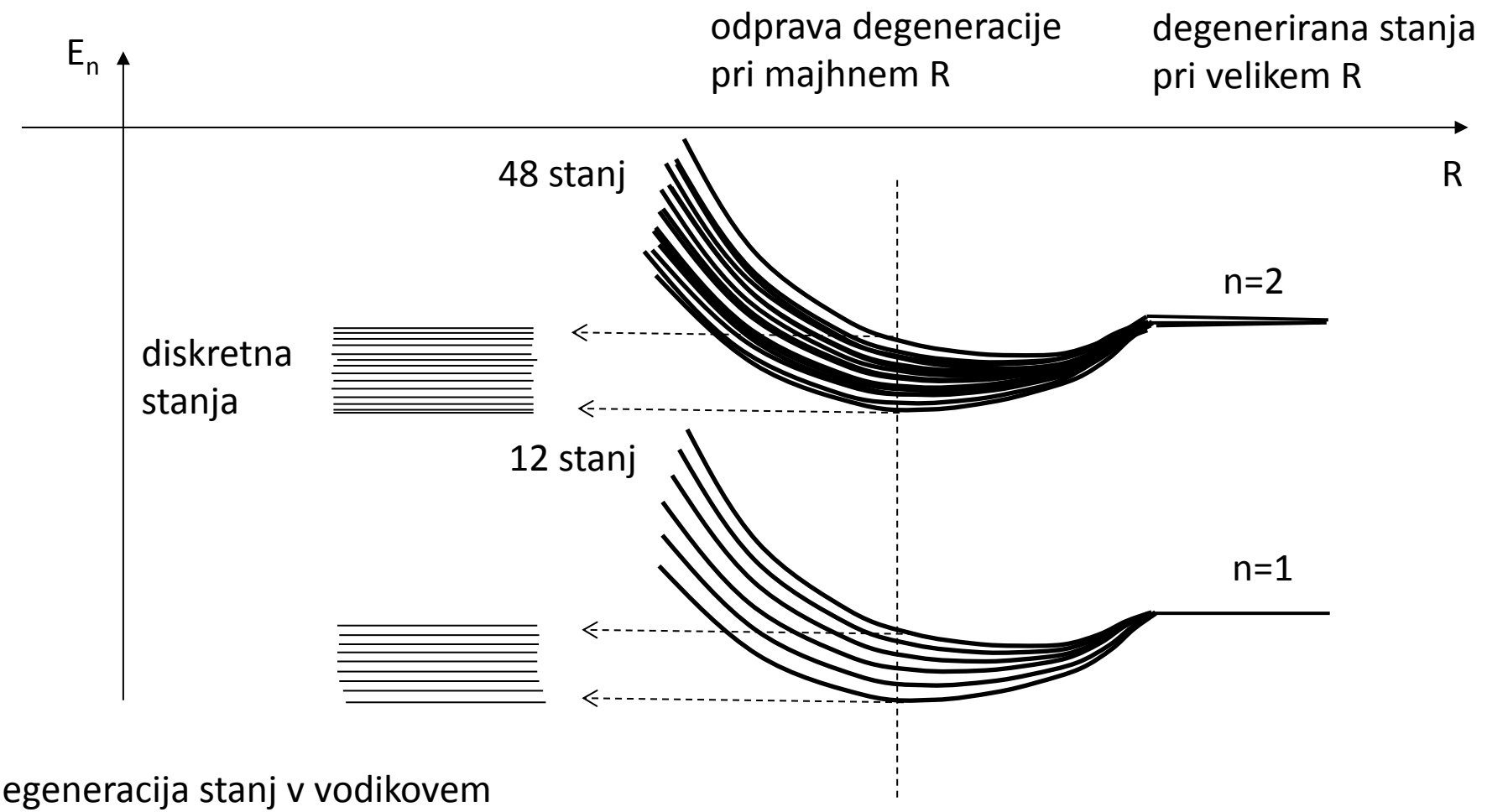
$$a = \frac{\pi}{\alpha c \mu}$$

$$E_n = -\frac{1}{2} c^2 \mu \frac{Z\alpha^2}{n^2}$$

pri manjšem R se stanja prekrivajo, posledica je odprava degeneracije







degeneracija stanj v vodikovem atomu:

$n=n_r+\ell+1$

$\ell = 0, 1, ..., n-1$

$m_\ell = -\ell, -\ell+1, ..., \ell-1, \ell$

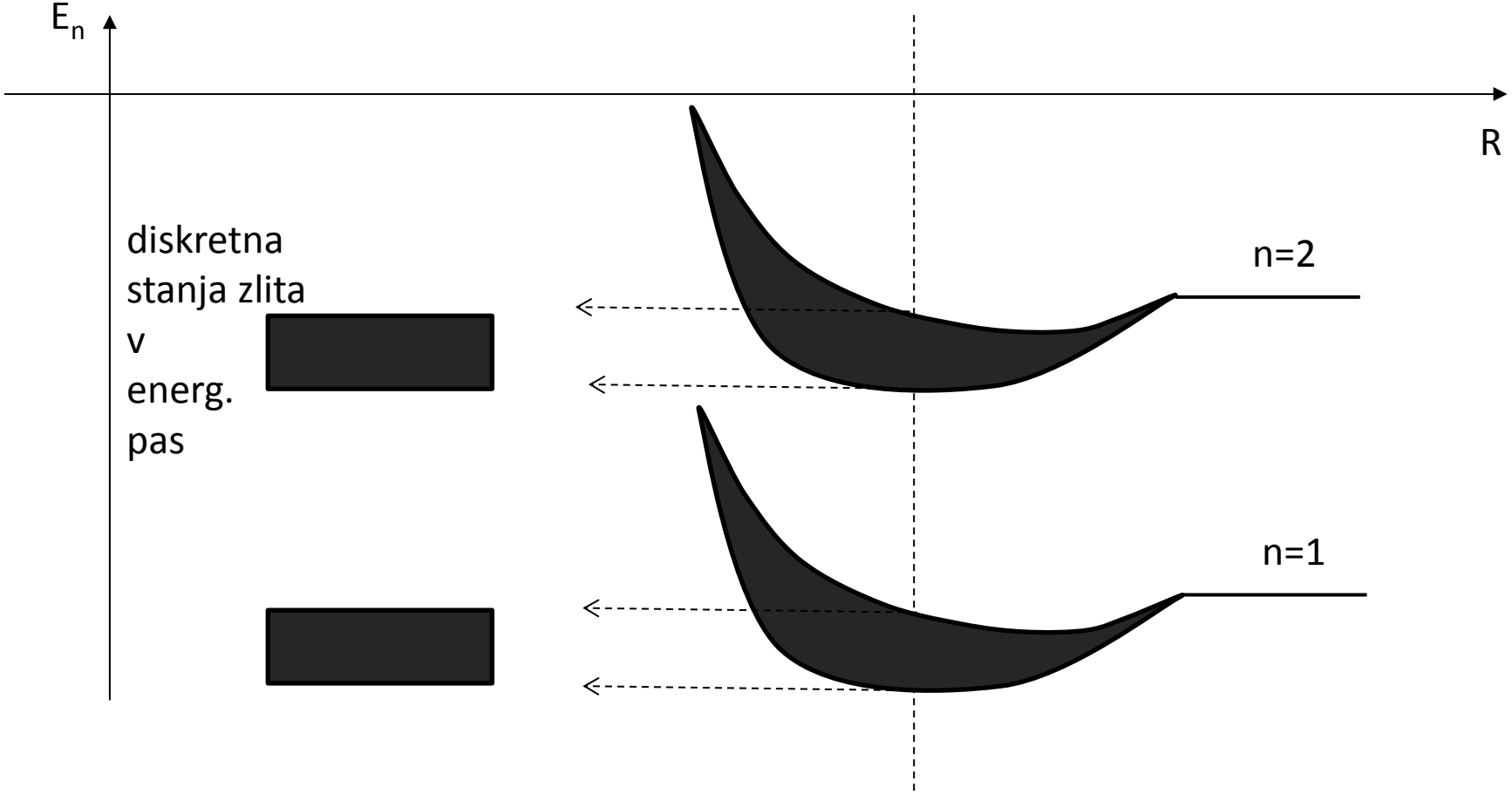
število stanj z enako energijo

$n^2 \rightarrow 2n^2$ (spin)

6 vodikovih atomov:

n=1 št. stanj $6 \cdot 2\ n^2 = 12$

n=2 št. stanj $6 \cdot 2\ n^2 = 48$



vodikov „kristal“:
10^{22} atomov / cm^3

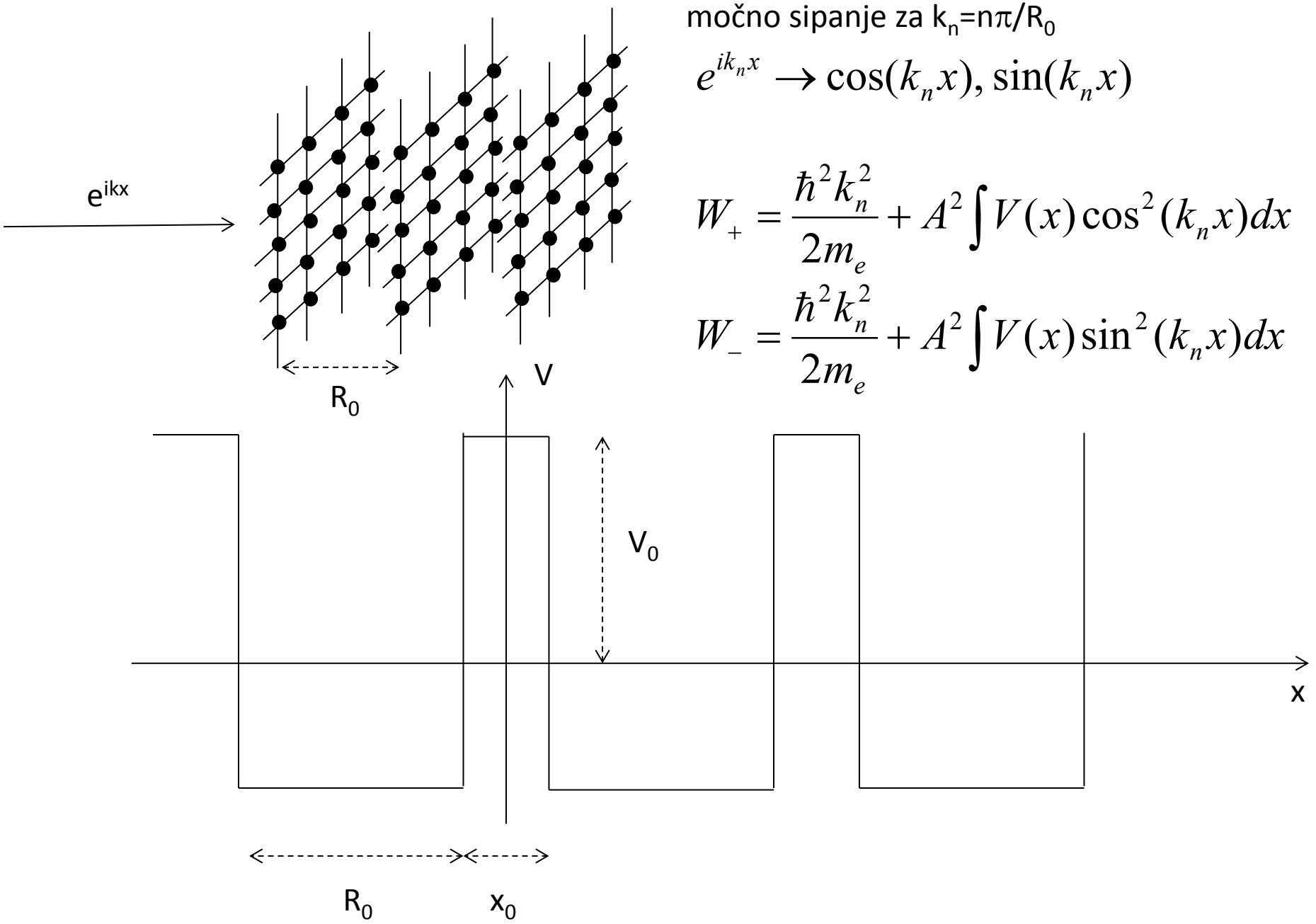
e^- v periodičnem potencialu

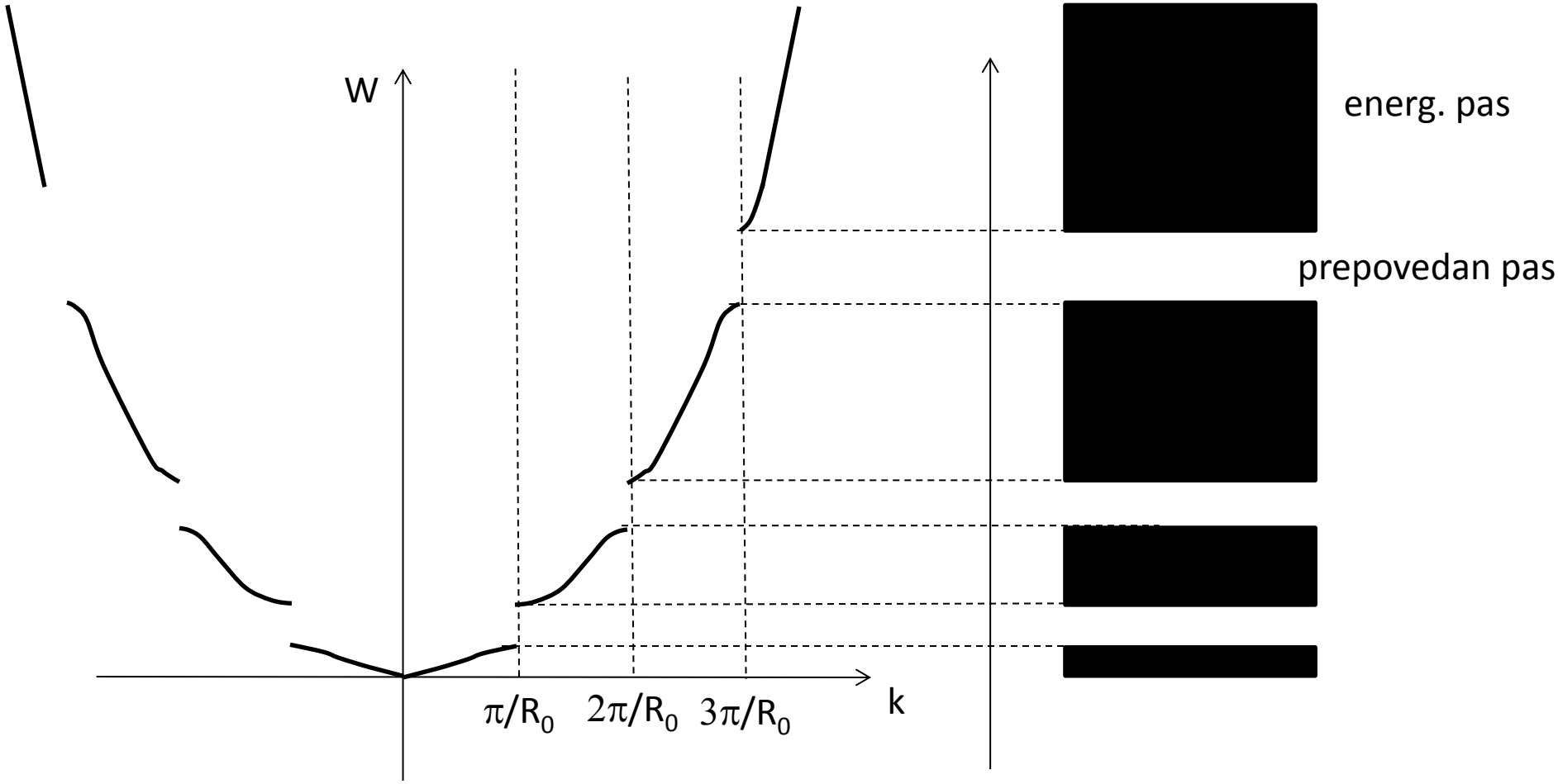
močno sipanje za $k_n = n\pi/R_0$

$$e^{ik_n x} \rightarrow \cos(k_n x), \sin(k_n x)$$

$$W_+ = \frac{\hbar^2 k_n^2}{2m_e} + A^2 \int V(x) \cos^2(k_n x) dx$$

$$W_- = \frac{\hbar^2 k_n^2}{2m_e} + A^2 \int V(x) \sin^2(k_n x) dx$$




W
k
π/R0
2π/R0
3π/R0
energ. pas
prepovedan pas