Adsorption of a wormlike chain in a rectangular potential well

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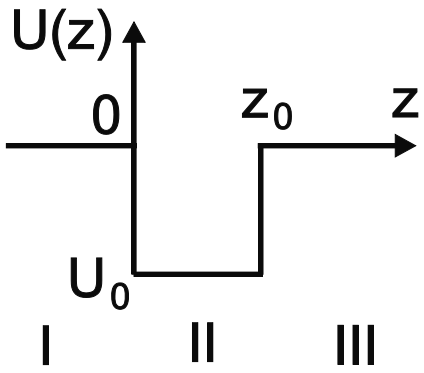

Adsorption of flexible polymers: quantum particle in potential well, continuity of ψ and ψ' at jumps of the potential

Adsorption of a semiflexible polymer: new paradigm

$$\left(\frac{\partial}{\partial L}-\frac{1}{2l_p}\nabla^2_{\theta\phi}+\mathbf{t}_{\theta\phi}\nabla_{\mathbf{r}}+U(\mathbf{r})\right)<\mathbf{r},\theta,\phi,N|\psi>=0$$

∞ components

Representation: $<\mathbf{r},\theta,\varphi,N|\psi>=\sum_{lm}Y_{lm}(\theta,\varphi)<r,lm|\psi>$

Wave function and wavevectors in I, II, and III (l=0,1): $\psi_4=c_0\exp(pN+ikz)\begin{pmatrix}1\\0\\\frac{-ik}{\sqrt{3}(1+p)}\\0\end{pmatrix}$

I, III: $\kappa=\sqrt{3}\sqrt{p+p^2}$, **II:** $k_1=\sqrt{3}\sqrt{-(p-U_0)^2-p+U_0}$

Energy eigenvalues: continuity of ψ at the jumps of the potential

$$\tan k_1 a=\frac{2k_1k\gamma}{k_1^2\gamma^2-k^2},\ \gamma=\frac{1+p}{1+p-U_0},$$

flexible: γ=1

Adsorption energy:

$$-E=\frac{3}{4}(U_0a)^2(1+3U_0+\cdots)$$

l=0,1,2,…: boundary conditions for ψ_I, ψ_{II}, and ψ_{III} not clear yet