

$$E_{\text{pinning}} = E_{(1)} - E_{(2)}$$

(1)



vortex-pinned

uniform

-

(2)



nucleus



vortex

$$E_{\text{pinning}} = E_{\text{nuc}}^{\text{vor}} - E_{\text{unif}}^{\text{vor}}$$

(a)

vortex-pinned



(b)

nucleus



-

(c)

vortex



(d)

uniform

-

$$E_{\text{nuc}}^{\text{vor}} =$$

$$E_{\text{unif}}^{\text{vor}} =$$