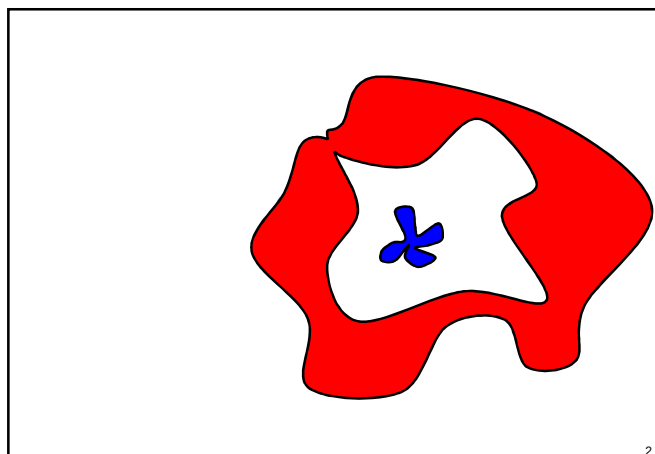
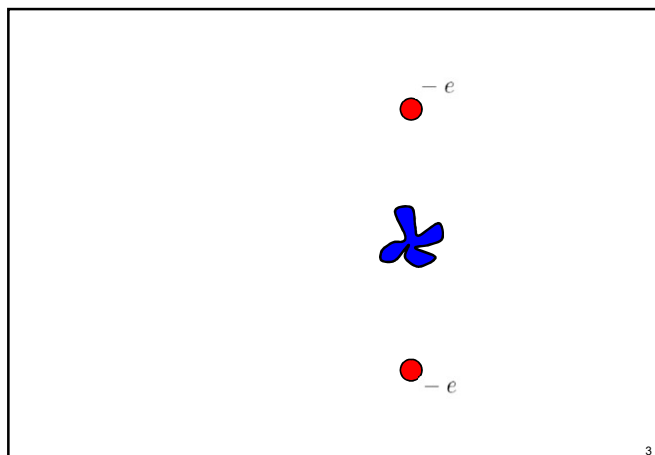
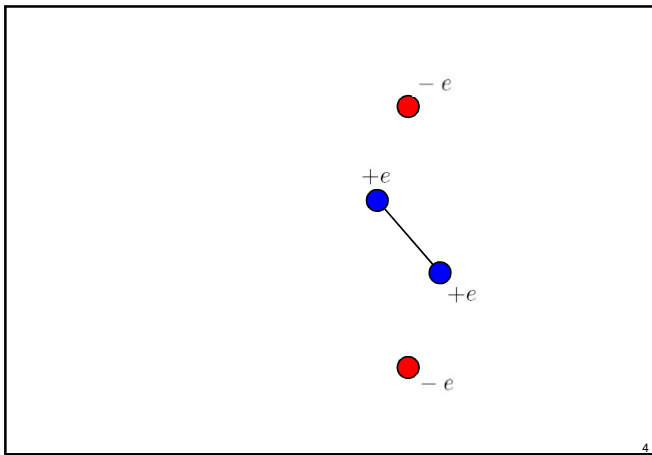


a toy model for
the monopole shift

www.hyperfinecourse.org







Exactly solvable classical toy model : no electrons in nucleus

a)

b)

$$E_0(\theta) = -2C \left(\frac{1}{\sqrt{\ell^2 \sin^2 \theta + (d - \ell \cos \theta)^2}} + \frac{1}{\sqrt{\ell^2 \sin^2 \theta + (d + \ell \cos \theta)^2}} \right) \quad C = e^2 / (4\pi\epsilon_0)$$

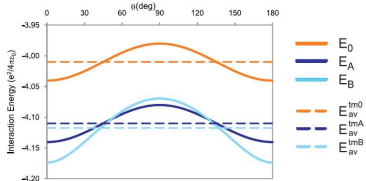
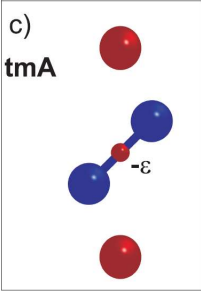
Exactly solvable classical toy model : no electrons in nucleus

a)

b)

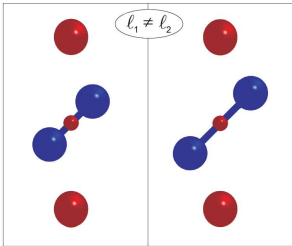
$$E_0(\theta) = -2C \left(\frac{1}{\sqrt{\ell^2 \sin^2 \theta + (d - \ell \cos \theta)^2}} + \frac{1}{\sqrt{\ell^2 \sin^2 \theta + (d + \ell \cos \theta)^2}} \right) \quad C = e^2 / (4\pi\epsilon_0)$$

Exactly solvable classical toy model : **with** electrons in nucleus



$$E_A(\theta) = E_0(\theta) + \underbrace{\frac{-2eC}{ef}}_{E_{\text{corr}}}$$

Exactly solvable classical toy model : **isotope shift**



$$E_A(\theta) = E_0(\theta) + \underbrace{\frac{-2eC}{ef}}_{E_{\text{corr}}}$$
