

Magnetic Field can do Work on $\vec{\mu}$

From Physics 211: $W = \int \tau d\theta$

From Physics 212: $\vec{\tau} = \vec{\mu} \times \vec{B} = \mu B \sin(\theta)$

$$W = \int \mu B \sin(\theta) d\theta = \mu B \cos(\theta) = \vec{\mu} \cdot \vec{B}$$

$$\Delta U = -W$$

Define $U = 0$ at position of maximum torque

$$U \equiv -\vec{\mu} \cdot \vec{B}$$

