

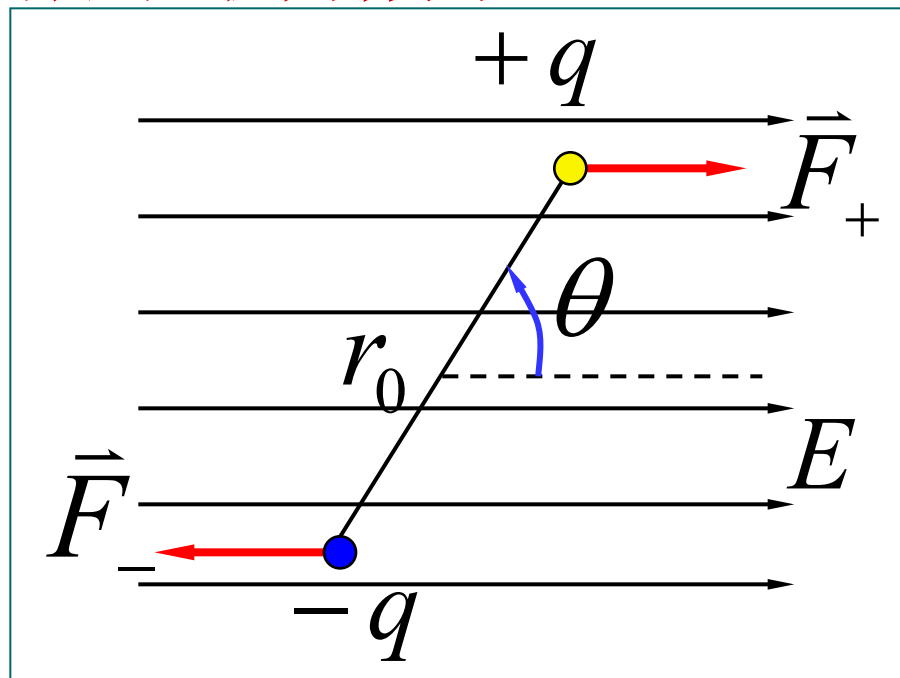

## 一 外电场对电偶极子的力矩和取向作用

◆ 匀强电场中

$$\begin{aligned}\vec{F} &= \vec{F}_+ + \vec{F}_- \\ &= q\vec{E} - q\vec{E} = 0\end{aligned}$$

$$\begin{aligned}M &= qr_0 E \sin \theta \\ &= pE \sin \theta\end{aligned}$$

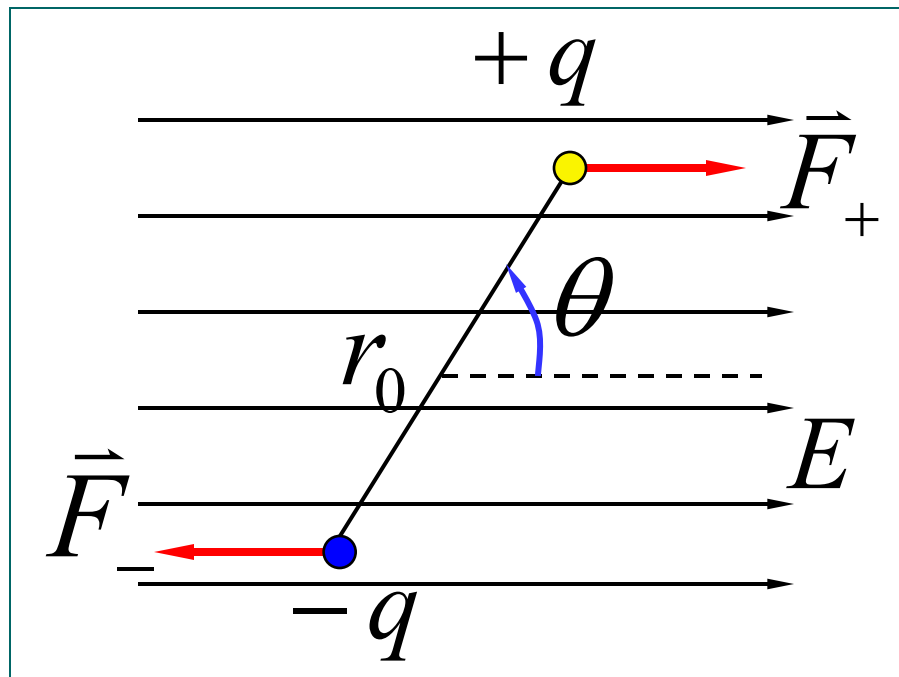
$$\vec{M} = \vec{p} \times \vec{E} \quad \left\{ \begin{array}{ll} \theta = 0 & \vec{M} = 0 \quad \text{稳定平衡} \\ \theta = \pi & \vec{M} = 0 \quad \text{非稳定平衡} \end{array} \right.$$

◆ 非匀强电场中  $\vec{F} = \vec{F}_+ + \vec{F}_- = q\vec{E}_+ - q\vec{E}_- \neq 0$  

## 二 电偶极子在电场中的电势能和平衡位置

$$\begin{aligned} E_p &= qV_+ - qV_- \\ &= -q\left(-\frac{V_+ - V_-}{r_0 \cos \theta}\right)r_0 \cos \theta \\ &= -qr_0 E \cos \theta \end{aligned}$$

$$E_p = -\vec{p} \cdot \vec{E}$$



{	$\theta = 0$	$E_p = -p \cdot E$	能量最低
	$\theta = \pi / 2$	$E_p = 0$	
	$\theta = \pi$	$E_p = p \cdot E$	能量最高

