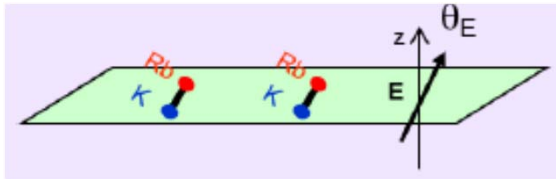
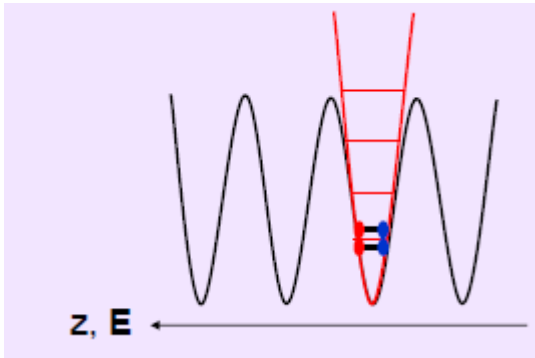
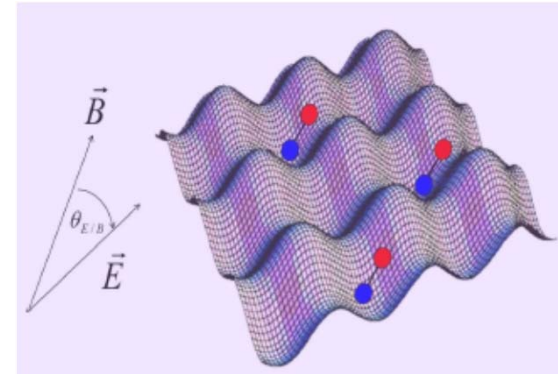


Ultracold collisions between dipolar particles in tilted field and external confinement



Polar molecules in external field= interacting induced (aligned) dipole moments



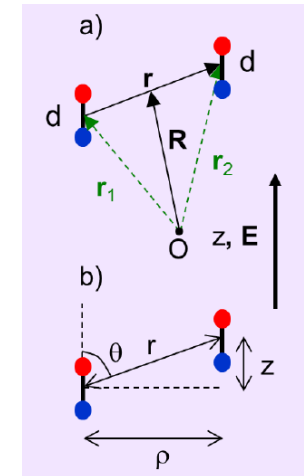
1D harmonic oscillator

Wavefunctions in spherical coordinates

$$-V_{ho} = \frac{1}{2} m_1 \omega^2 z_1^2 + \frac{1}{2} m_2 \omega^2 z_2^2$$

→ quantum number n_1, n_2

$$\psi(\vec{r}) = \sum_{l, m_l} \frac{1}{r} F_{l, m_l}(r) Y_l^{m_l}(\theta, \varphi)$$



$$V = V_{vdW} + V_{dd} + V_{ho} = -\frac{C_6}{r^6} + \frac{d^2(\theta_E)(1-3\cos^2(\theta))}{4\pi\epsilon_0 r^3} + \frac{1}{2}\mu\omega^2 z^2$$

$$\left(-\frac{\hbar^2}{2\mu} \frac{\partial^2}{\partial r^2} + \frac{\hbar^2 l(l+1)}{2\mu r^2} - \frac{C_6}{r^6} - \frac{C_3(l, m_l, l, m_l)}{r^3} + \langle l, m_l | V_{ho} | l, m_l \rangle - E_c \right) F_{l, m_l}(r) + \sum_{l' \neq l} \langle l, m_l | V_{ho} | l', m_l \rangle F_{l', m_l}(r) + \sum_{l', m_l' \neq l, m_l} \left(-\frac{C_3(l, m_l, l', m_l')}{r^3} \right) F_{l', m_l'}(r) = 0$$