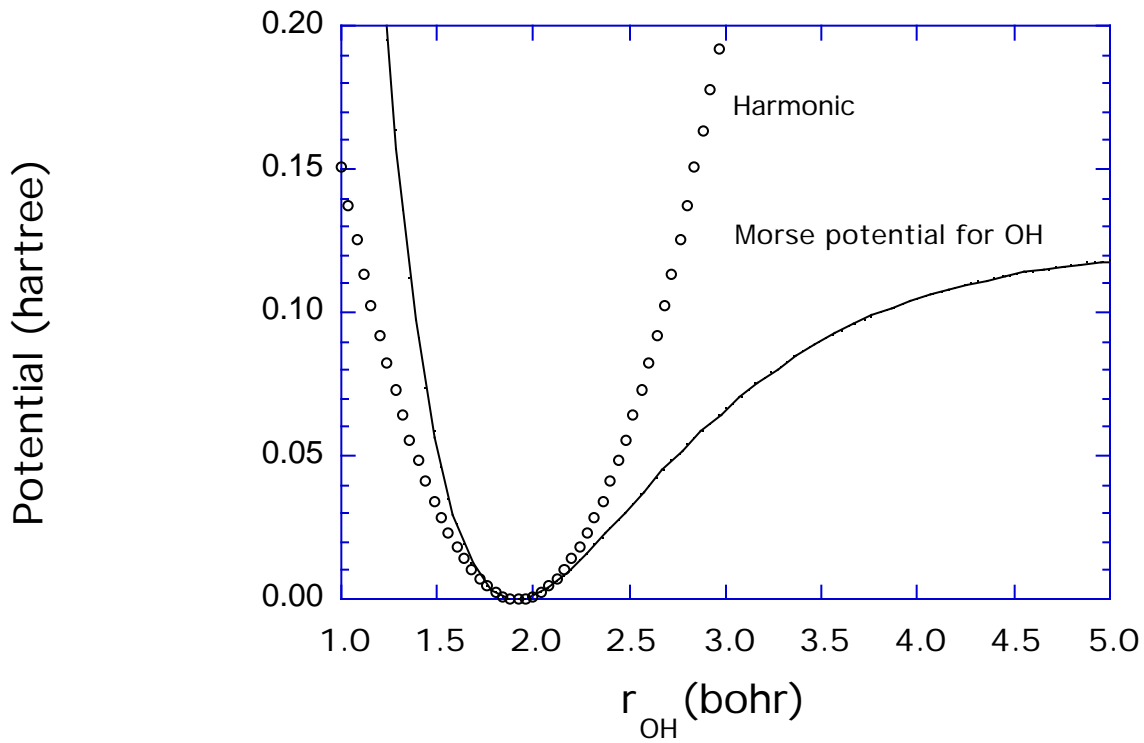


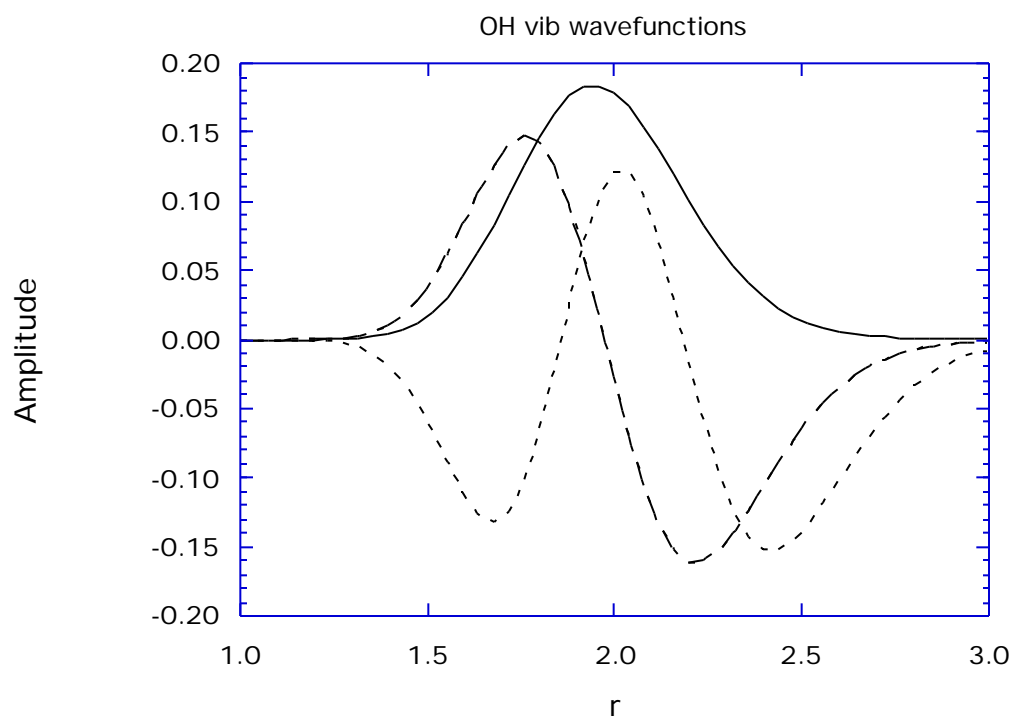
## Morse potential and relationship to Harmonic Oscillator

$$V(r) = D\{1 - \exp[-\alpha(r - r_e)]\}^2$$



The harmonic approximation is easy to derive  $V = \frac{1}{2} \mu \omega^2 (r - r_e)^2$  and from this and the "canonical" form of the HO  $V(r) = \frac{1}{2} \mu \omega^2 (r - r_e)^2$  we have  $\omega = \sqrt{2D / \mu}$

# Wavefunctions and energies



## Energies

	Exact	Harmonic
1	8.456440338658101E-003	1855.97
2	2.446728605879637E-002	5369.94
3	3.928337171427690E-002	8621.70
4	5.290469731205460E-002	11611.24
5	6.533126286656994E-002	14338.55
6	7.656306839953875E-002	16803.65