

A 3D plot of the probability density formed by the in-phase overlap of 1s atomic orbitals on two interacting hydrogen atoms, i.e.

$$\Psi_+^* \Psi_+ = \frac{1}{2} (A^2 + B^2 + 2AB)$$

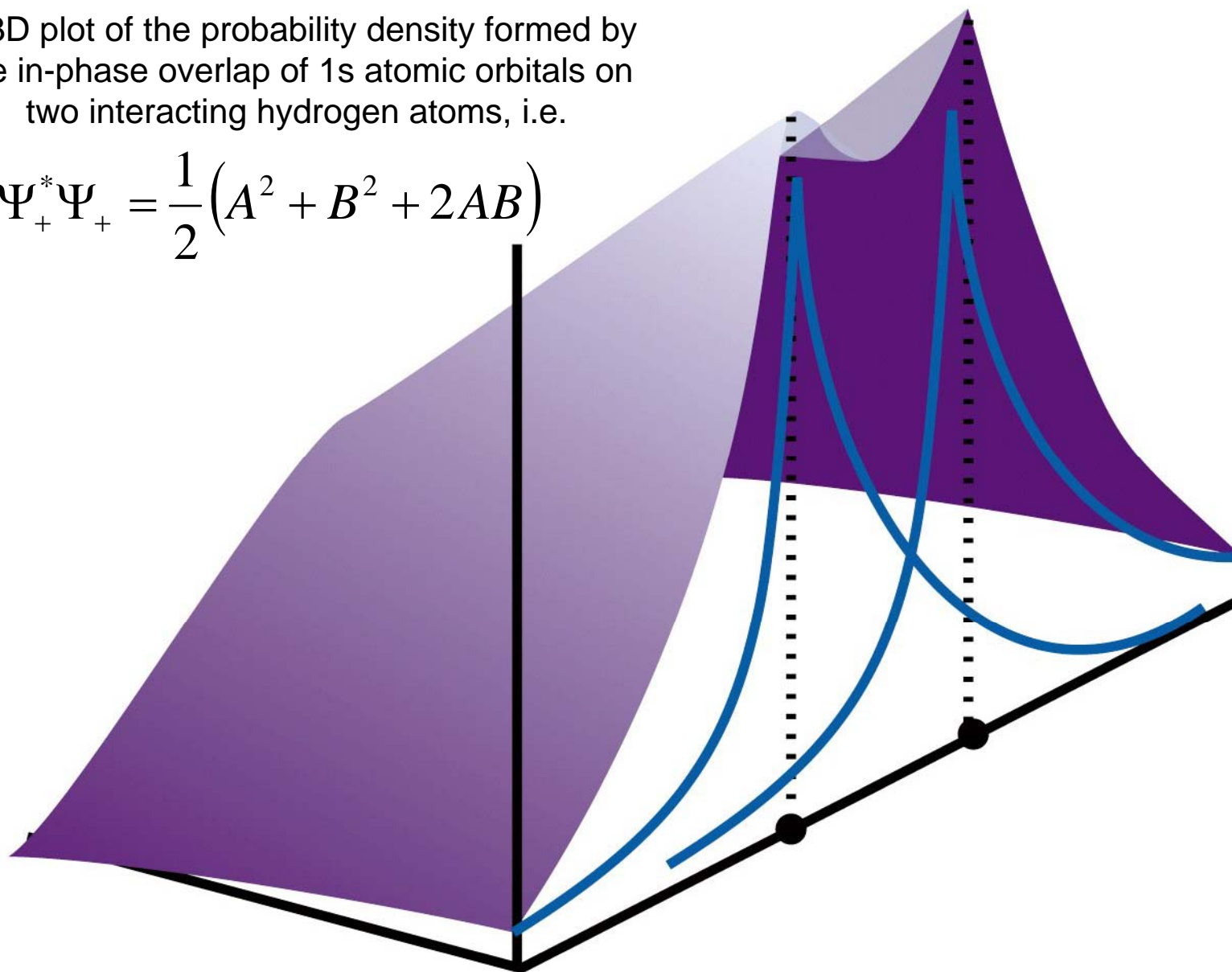
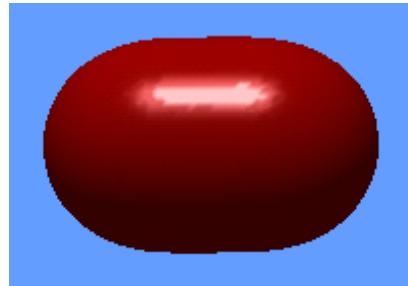
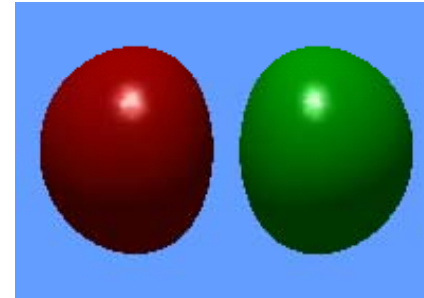
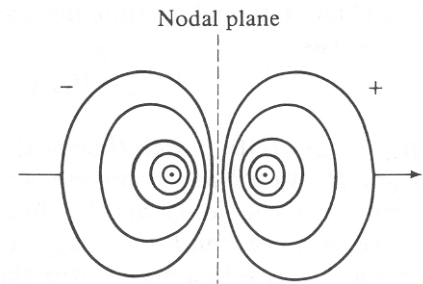
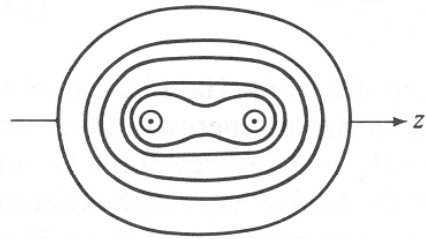


Figure 11-13a
Atkins Physical Chemistry, Eighth Edition
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The Molecular Orbitals of the Hydrogen Molecular Ion (Depicted as Boundary Surfaces (above) and 2D cross-sections (below))


 Ψ_+

 Ψ_-


(larger cross-sections contain larger fractions of the total probability density)

(Ira N. Levine, *Quantum Chemistry*, 3rd ed.; Allyn and Bacon: Boston, 1983.)