

Molecular Structure

Michael Brodskiy

Professor: Q. Yan

April 6, 2023

Contents

1	The Hydrogen Molecule	3
---	-----------------------	---

1 The Hydrogen Molecule

- How the wave function interaction binds the atoms together in a molecular shell
- Two possible wave functions between two same-charge particles:
 - $|\psi_1 + \psi_2|^2$: Relatively large in the region between the two protons
 - $|\psi_1 - \psi_2|^2$: No density midway between the two protons
- $\psi_1 + \psi_2$ is a bonding state
- $\psi_1 - \psi_2$ is an anti-bonding state
- Bonding in Molecules:
 - Covalent Bonding — Share electrons, occupation of bonding states lower the energy of the molecule
 - Ionic Bonding