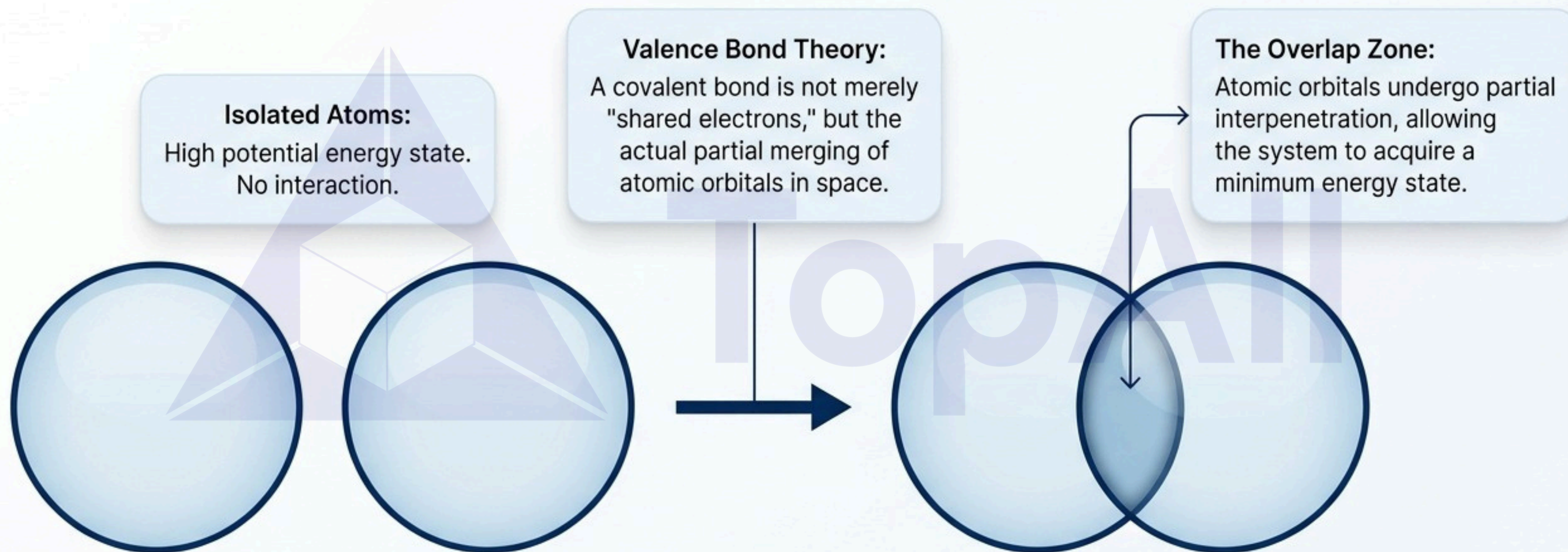
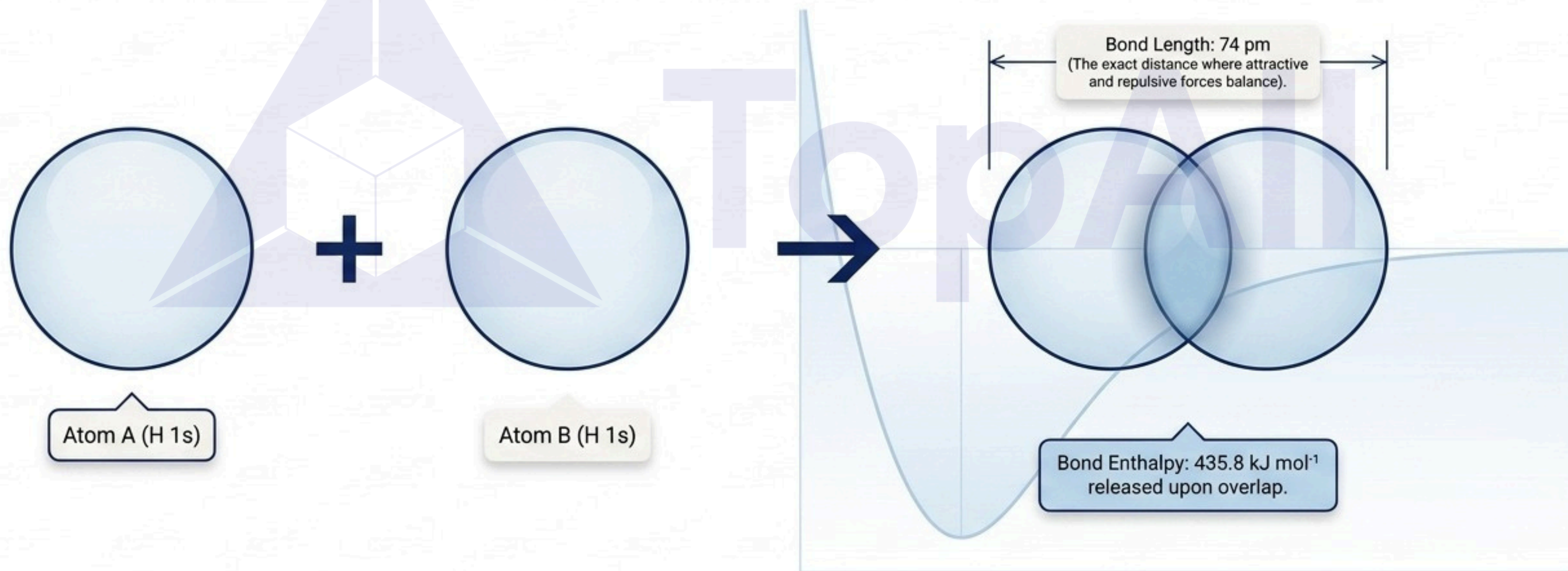


The Core Mechanism: Orbitals Interpenetrate



The Simplest Blueprint: H 1s + H 1s

The H₂ Molecule: The ultimate minimum energy state for two approaching hydrogen atoms.





You've Learned the Theory. Let's Test Them Now.

$$E=mc^2$$



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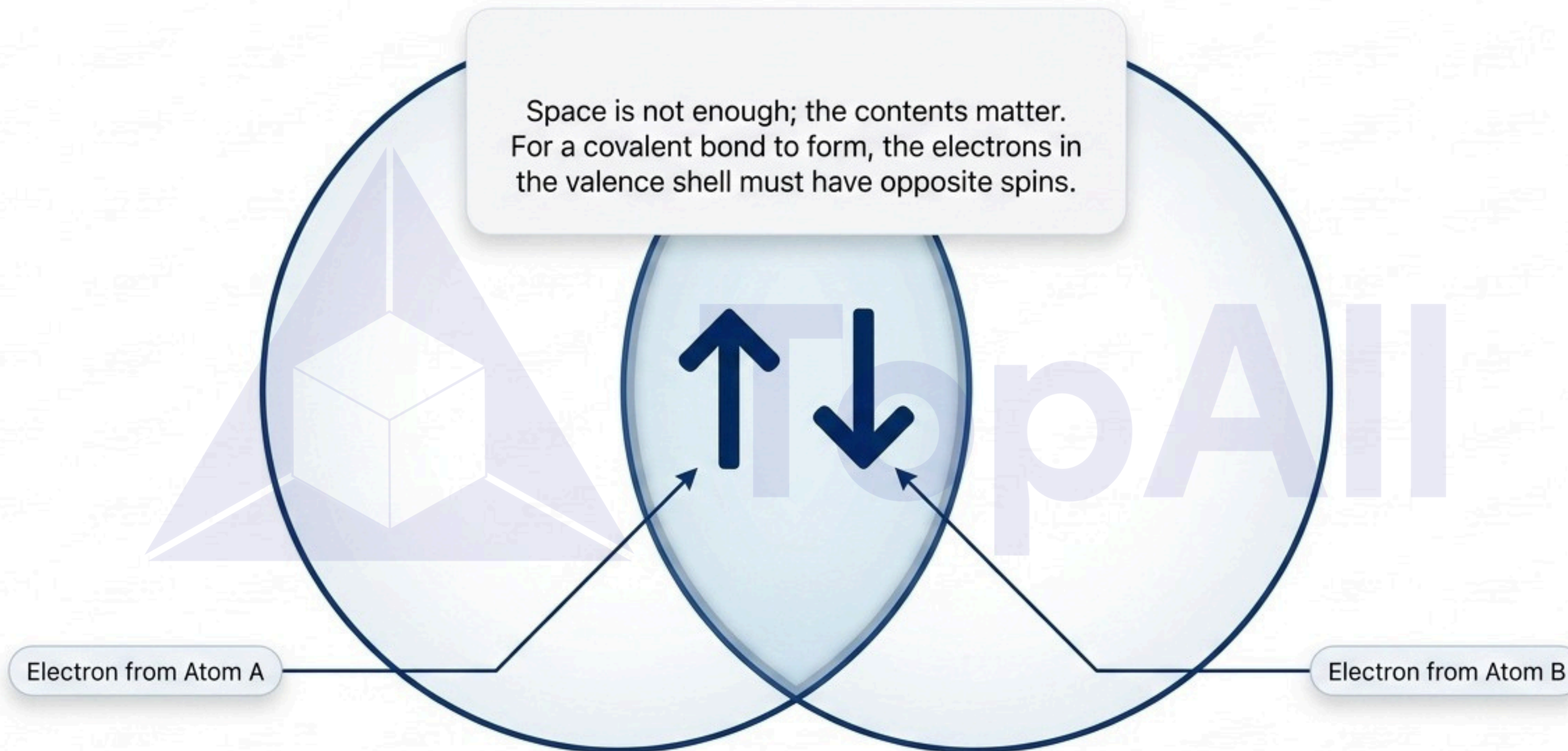
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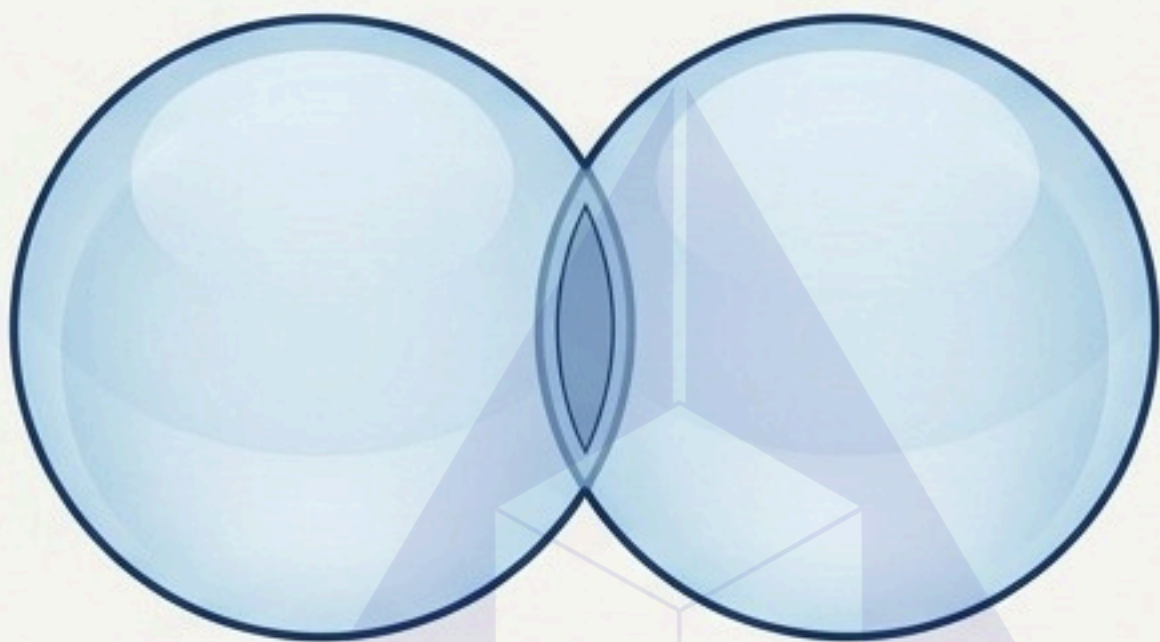


The Quantum Rule: Opposite-Spin Pairing



The Overlap Condition: Overlapping of atomic orbitals directly results in the pairing of these opposite-spin electrons, finalizing the covalent bond.

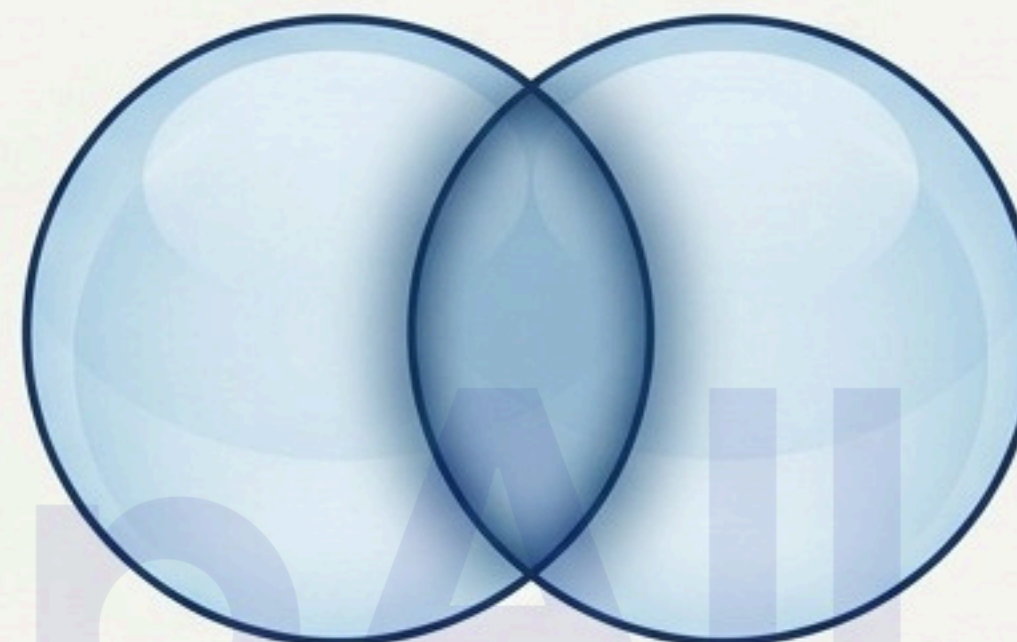
The Core Variable: Greater Overlap = Stronger Bond



Weak Overlap

Less Extent of Overlap

Weaker Covalent Bond
Lower Bond Enthalpy



Strong Overlap

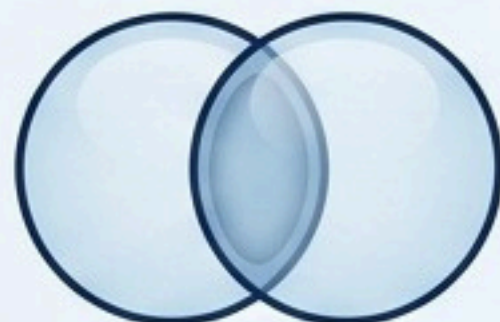
Greater Extent of Overlap

Stronger Covalent Bond
Higher Bond Enthalpy

The Overlap Proportionality: The physical extent of orbital overlap strictly dictates the ultimate strength of a covalent bond.

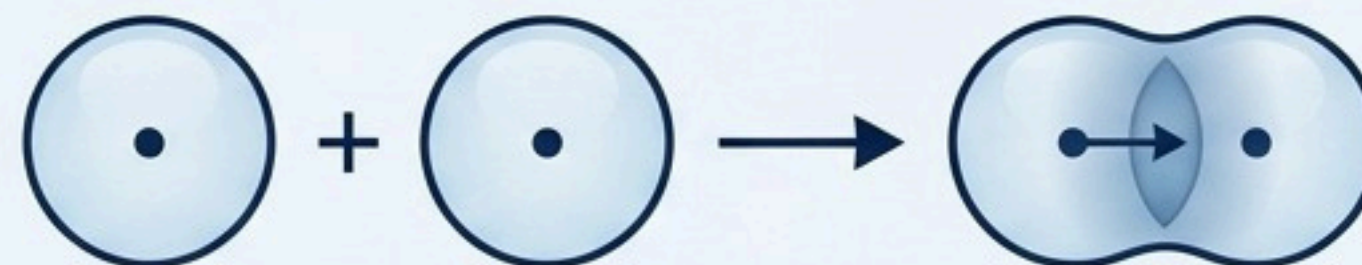
Revision Frame: Orbital Overlap Concept

1. The Mechanism



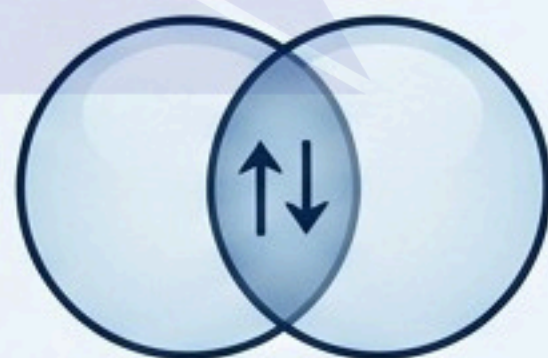
A covalent bond is the partial interpenetration (merging) of atomic orbitals to reach a minimum energy state.

2. The Blueprint



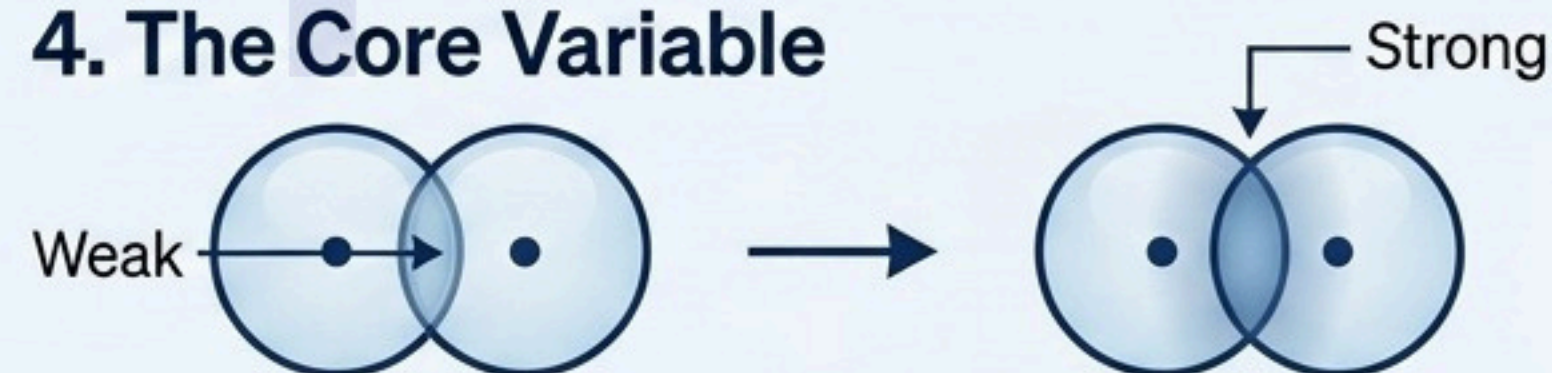
H₂ forms via the overlap of two H 1s orbitals, stabilizing at a 74 pm bond length.

3. The Quantum Rule



Electrons within the merging valence shells must possess opposite spins to pair successfully.

4. The Core Variable



Bond strength is directly proportional to the extent of overlap. Greater overlap = stronger bond.



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