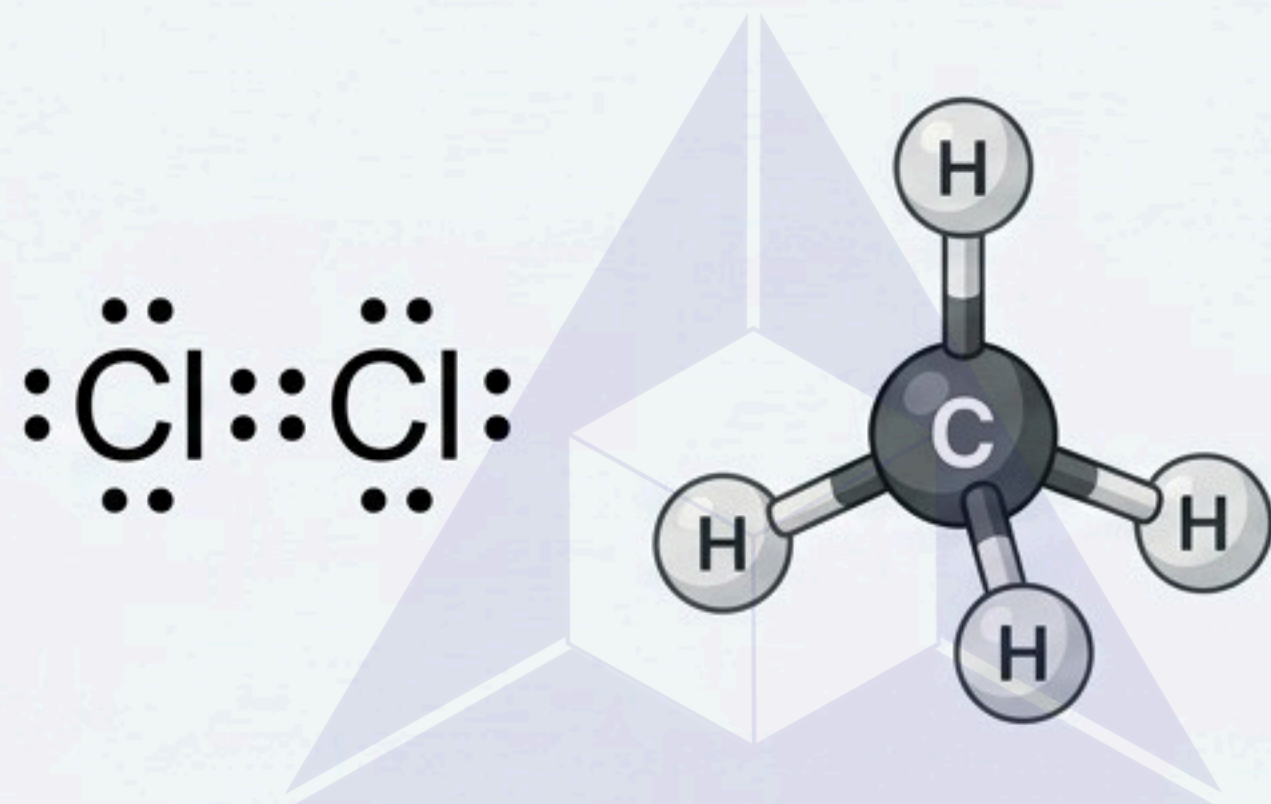


The Blindspots of Lewis & VSEPR

Capabilities (The “What”)



- ✓ **Tracks** valence electrons and octets.
- ✓ **Predicts** 3D molecular geometry.

Blindspots (The “Why”)

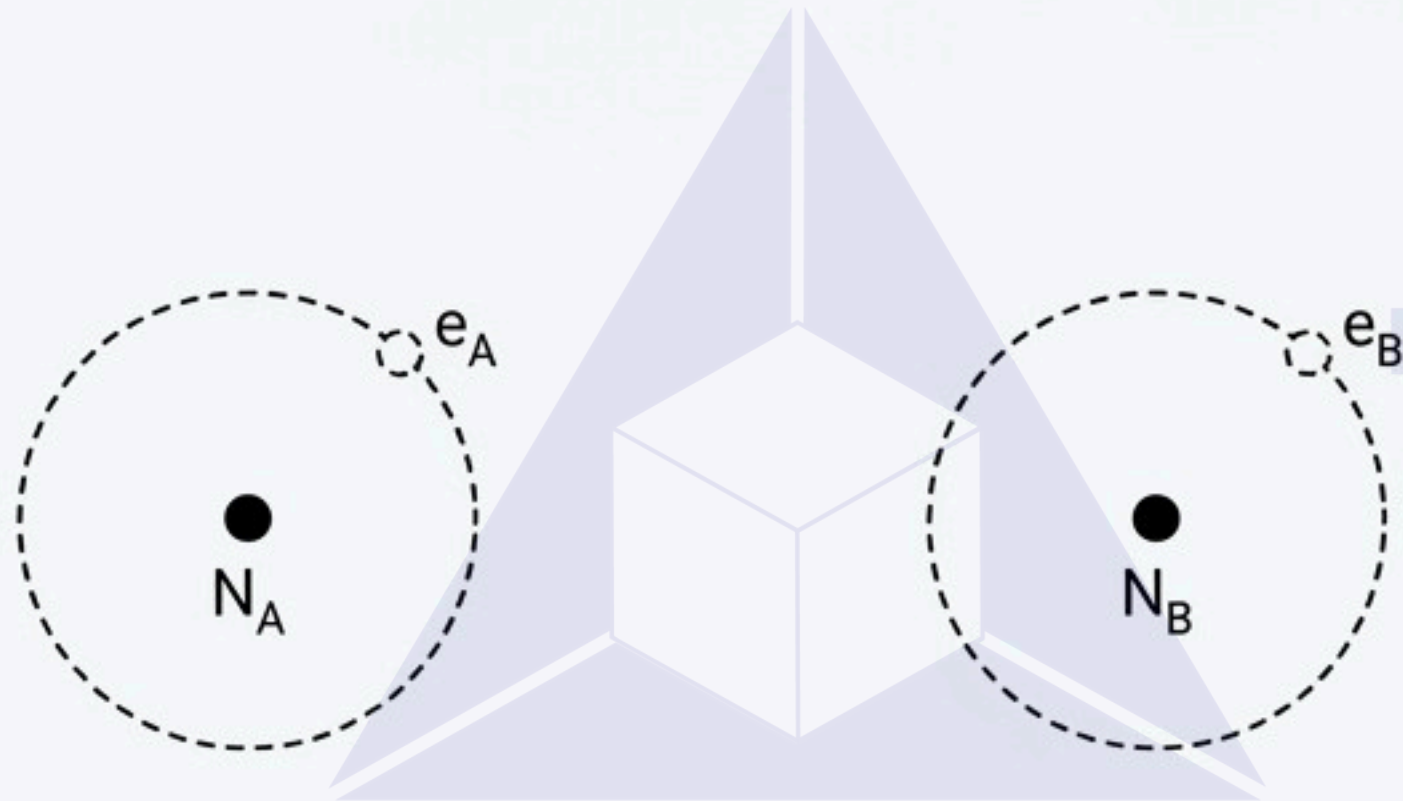


- ✗ **Mechanics:** Explains that atoms share electrons, but not why or how.
- ✗ **Energetics:** Fails to explain energy differences. (e.g., Why does H_2 require $435.8 \text{ kJ mol}^{-1}$ to break, while F_2 requires only 155 kJ mol^{-1} , despite both being single covalent bonds?).

To understand the why, we need a **quantum mechanical approach:**
Valence Bond (VB) Theory (Heitler & London, 1927).

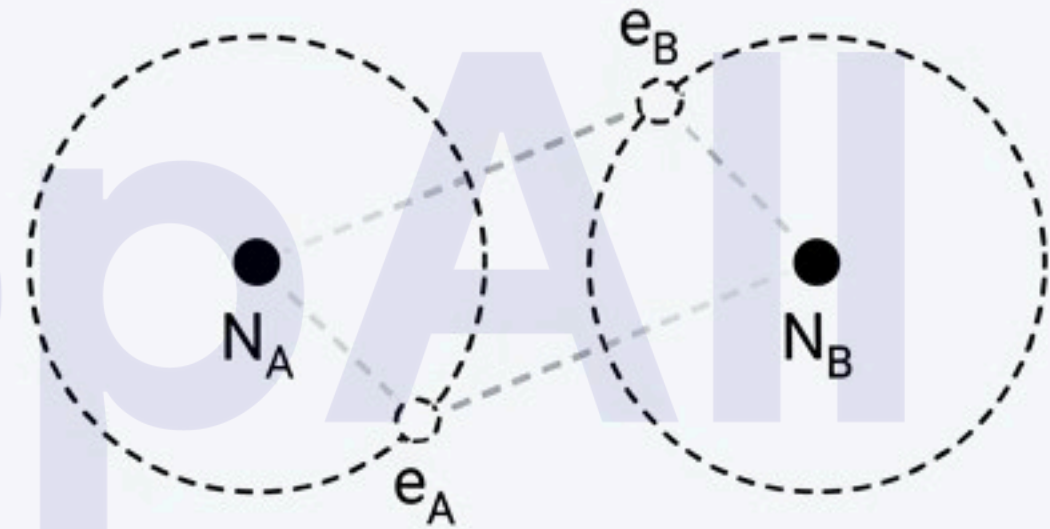
Setting the Stage: H₂ Formation

Panel 1: Infinite Distance



At infinite distance, there is zero interaction. The atoms exist as isolated quantum systems.

Panel 2: Proximity

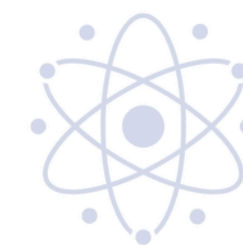


As the atoms approach, new inter-atomic forces emerge. The fate of the bond depends entirely on how these opposing forces interact.



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

$$E=mc^2$$



Turn theory into marks with **unlimited MCQs, smart analysis, and focused revision.**

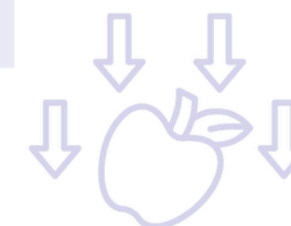
Practice Now



At prep.topall.app

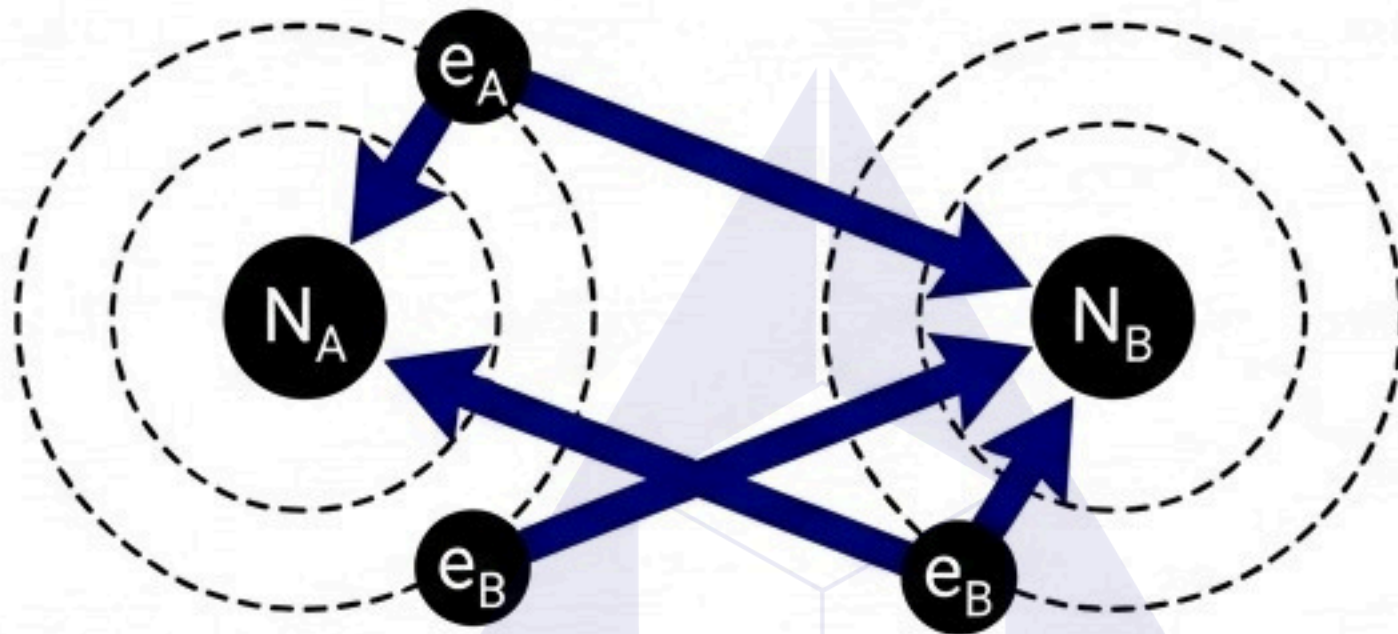
Key Highlights

- » Free Study Material, Videos & Infographics
- » Push Your Limits with Level-Based Challenges
- » Climb the Leaderboard Among Fellow Aspirants
- » Practice Unlimited MCQs for NEET & JEE
- » Get Clear Explanations, Not Just Marks
- » Track Your Performance Smarter



The Tug-of-War: Attraction vs. Repulsion

Attractive Forces



Old Forces:

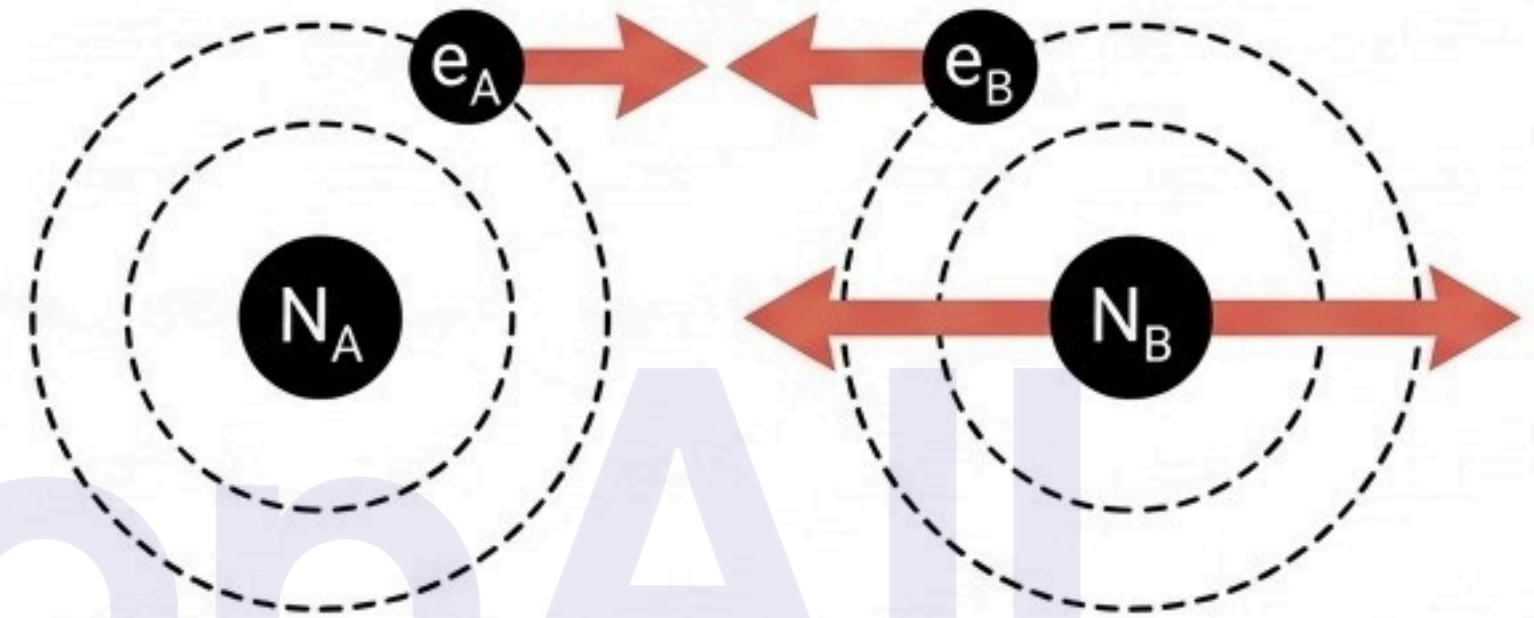
- N_A pulls e_A
- N_B pulls e_B

New Forces:

- N_A pulls e_B
- N_B pulls e_A

Tend to bring the atoms closer together.

Repulsive Forces



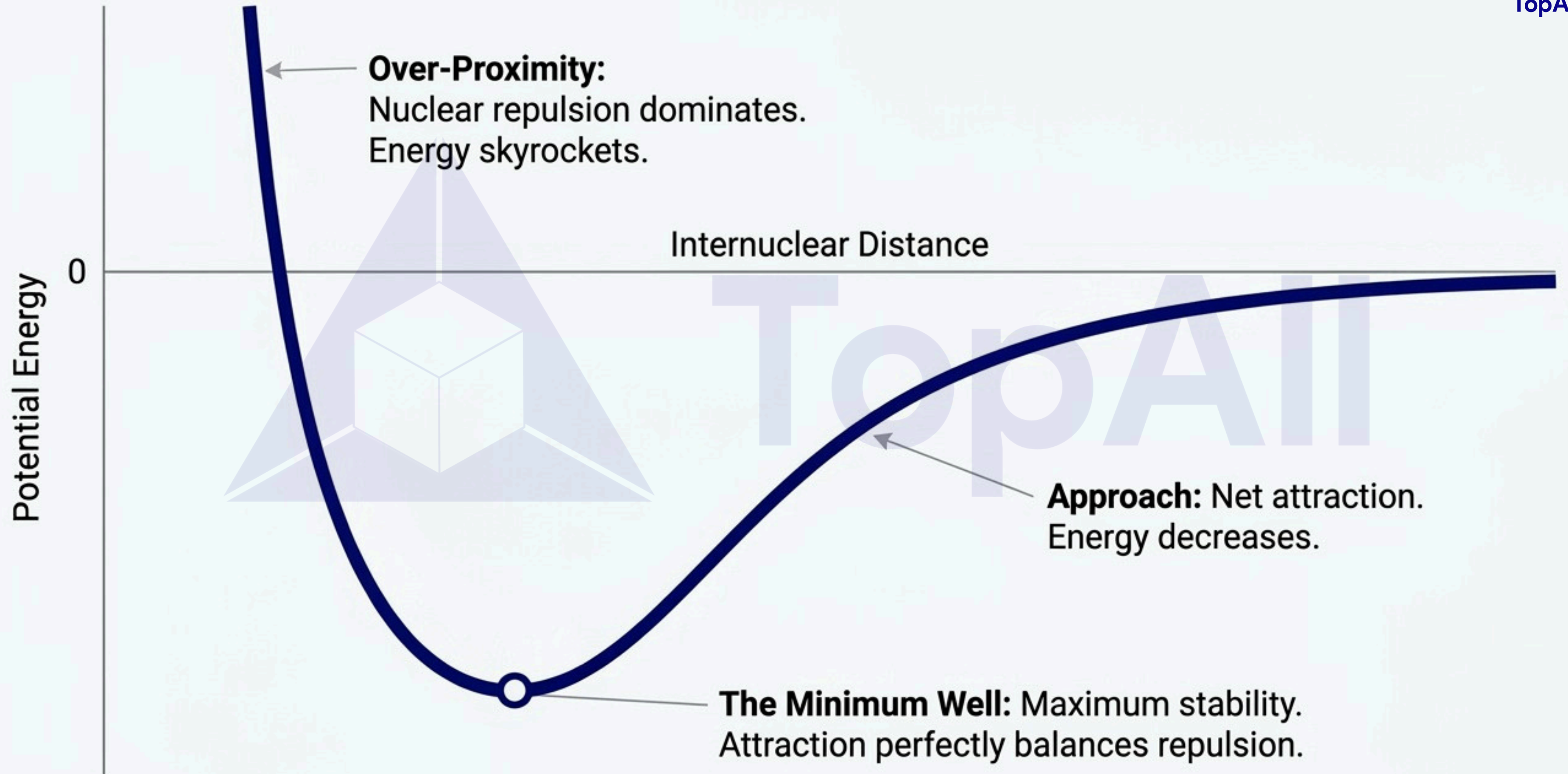
New Forces:

- e_A repels e_B
- N_A repels N_B

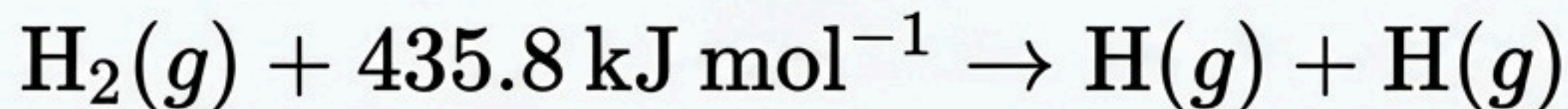
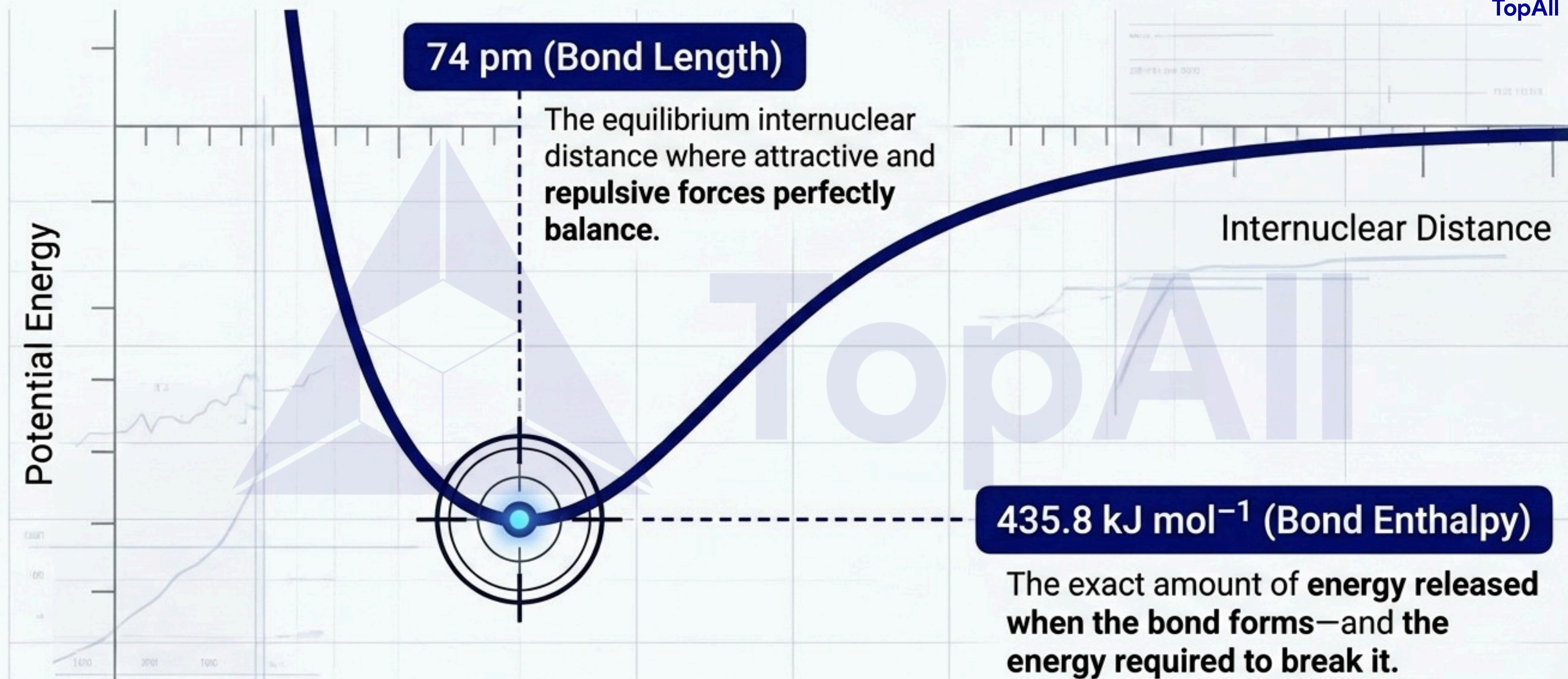
Tend to push the atoms apart.

Experimentally, the magnitude of the new attractive forces outweighs the new repulsive forces.
The atoms draw closer.

The Potential Energy Curve



The Anatomy of a Stable Bond



REVISION FRAME: Valence Bond Theory



The Need

Lewis/VSEPR show geometry, but Valence Bond Theory explains the energetics and mechanics of overlapping orbitals.



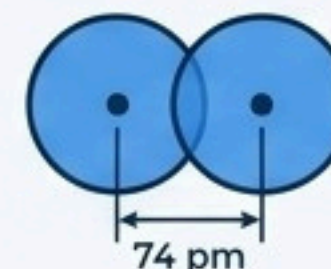
The Mechanism

Bond formation is a victory of Attractive Forces ($N \leftrightarrow e$) over Repulsive Forces ($N \leftrightarrow N, e \leftrightarrow e$).



The Rule

Every system tends to lower its energy. A stable bond is simply the state of minimum potential energy.



The Metrics

For H_2 , the ultimate energy minimum occurs at exactly 74 pm (Bond Length), releasing 435.8 kJ mol^{-1} (Bond Enthalpy).



You've Learned the Theory.

Now Let's Test It.

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