Nishant Jindal

CHEMICAL BONDING

O_2 = Paramag

energy level dia of O_2 [when total number of e^- > 14 e^-]

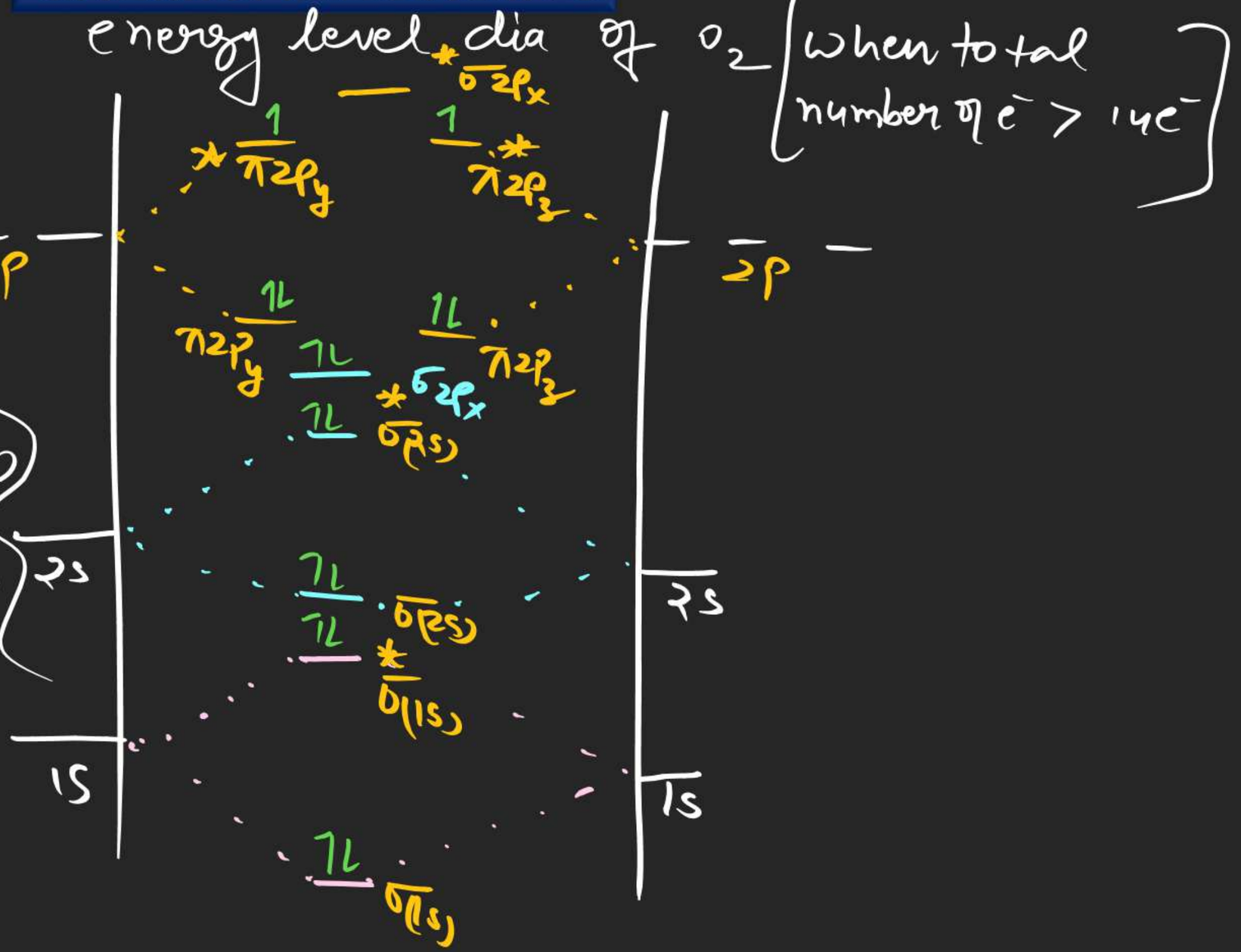
$B.O = \frac{1}{2}(N_B - N_A)$

N_B = no of e^- in B.M.O

N_A = no of e^- in A.B.M.O

$= \frac{1}{2}(10-6)$

$= \frac{1}{2} \times 4 = 2$



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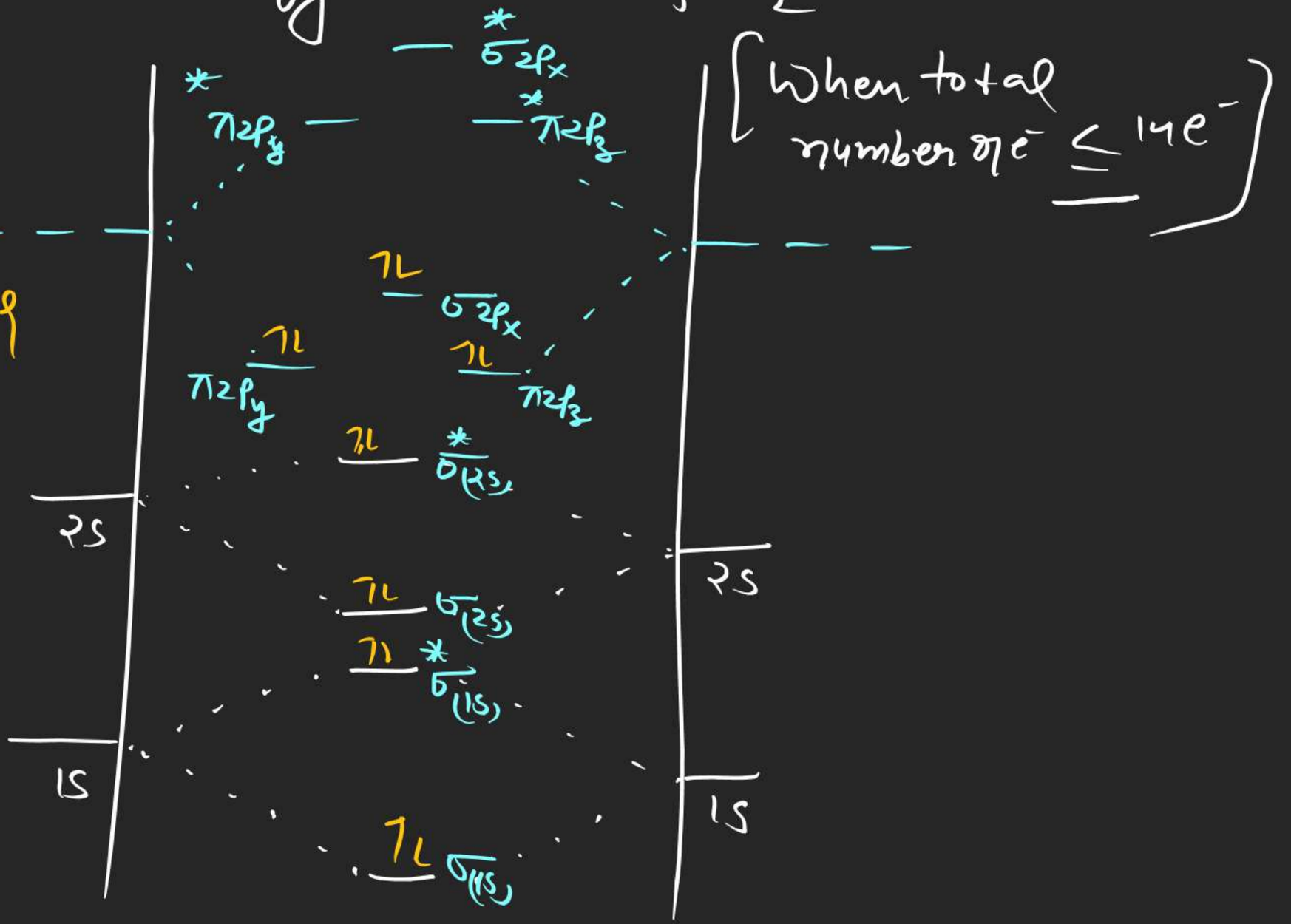
energy level dia. of N_2



[When total number of $e^- \leq 14e^-$]

Nature ⇒ Diamag

$$B.O = \frac{1}{2}(N_B - N_A)$$

$$= \frac{1}{2}(10-4)$$

$$= \frac{1}{2} \times 6$$

$$= 3$$

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Ord O_2 O_2^+ O_2^- O_2^{-2} O_2^{+2}

O_2 — B.O = 2 2.5 1.5 1 3

ABMO — $\uparrow$ $\uparrow$ / $\uparrow$ $\uparrow$ / $\uparrow$

B.O $\uparrow$ B.L $\downarrow$

B.L = $O_2^{-2} > O_2^- > O_2 > O_2^+ > O_2^{+2}$

Keypoint

$B.O = \frac{1}{2}(N_B - N_A)$

Ord N_2 N_2^+ N_2^- N_2^{-2} N_2^{+2}

1 e^- $\uparrow$ in B.M.O then B.O $\uparrow$ by 0.5

1 e^- $\downarrow$ in B.M.O then B.O $\downarrow$ by 0.5

1 e^- $\uparrow$ in A.B.M.O then B.O $\downarrow$ by 0.5

1 e^- $\downarrow$ in AB.M.O then B.O $\uparrow$ by 0.5

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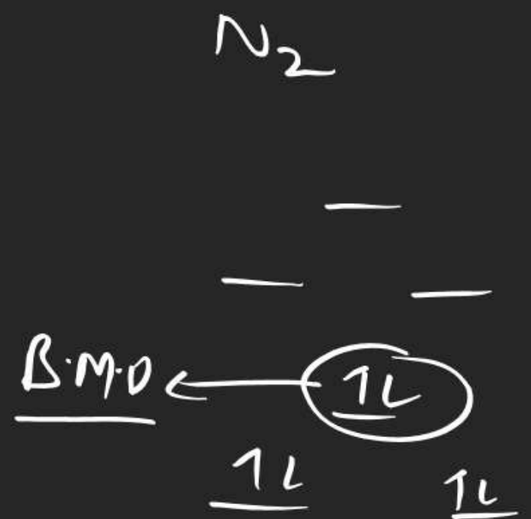
one order of B.L



	N_2	N_2^+	N_2^-	N_2^{-2}	N_2^{+2}
B.O =	3	2.5	2.5	2	2

$$N_2 < N_2^+ = N_2^- < N_2^{+2} = N_2^{-2}$$

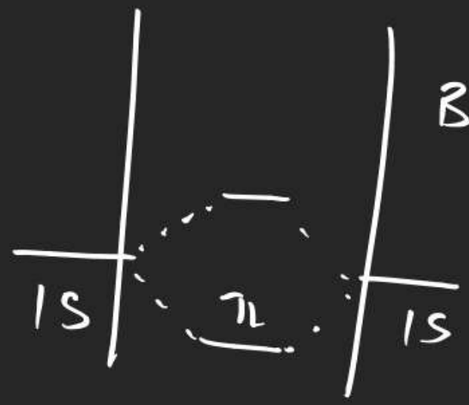
Ans = $N_2 < N_2^+ < N_2^- < N_2^{+2} < N_2^{-2}$

If Bond order Same, then number of A.B.M.O e^- ↑ then B.L ↑ due to Repulsion

H = 1S

H_2 H_2^+ H_2^-

B.O = 1 0.5 0.5



B.L $H_2 < H_2^+ < H_2^-$

$= \frac{1}{2}(N_B - N_A)$

$= \frac{1}{2}(2 - 0$

$= 1$

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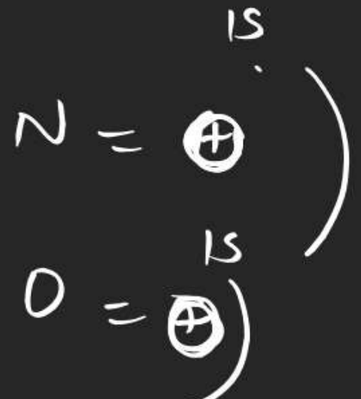
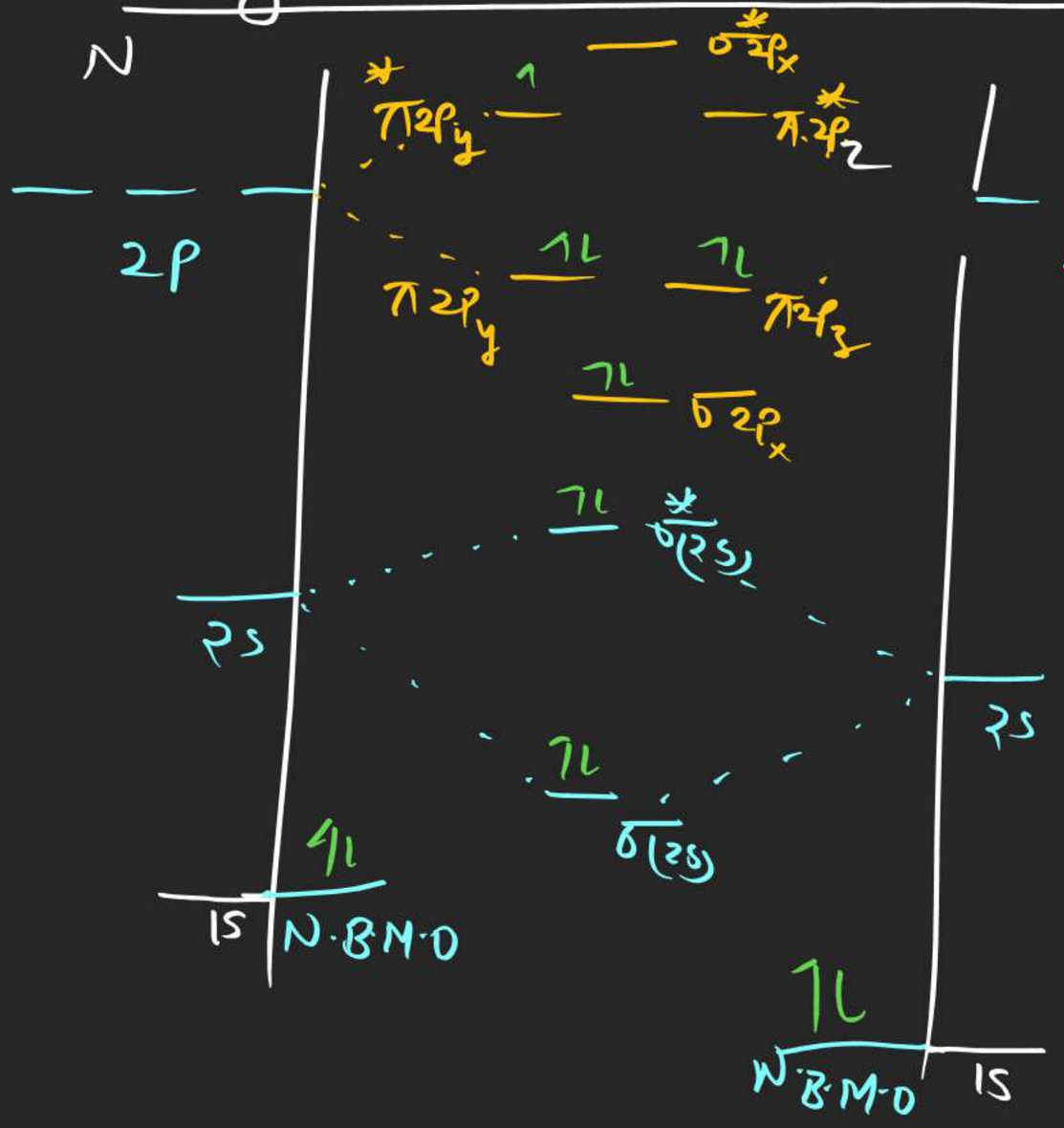
Energy level dia. of Heteronuclear dia. molecule

NO





$B.O = \frac{1}{2}(N_B - N_A)$

$= \frac{1}{2}(8-3)$

$= \frac{1}{2} \times 5$

$= 2.5$

Nature = paramag

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$$NO \longrightarrow NO^{+}$$

B.O = 2.5 3

B.L = 1.10 A° 1.06 A°

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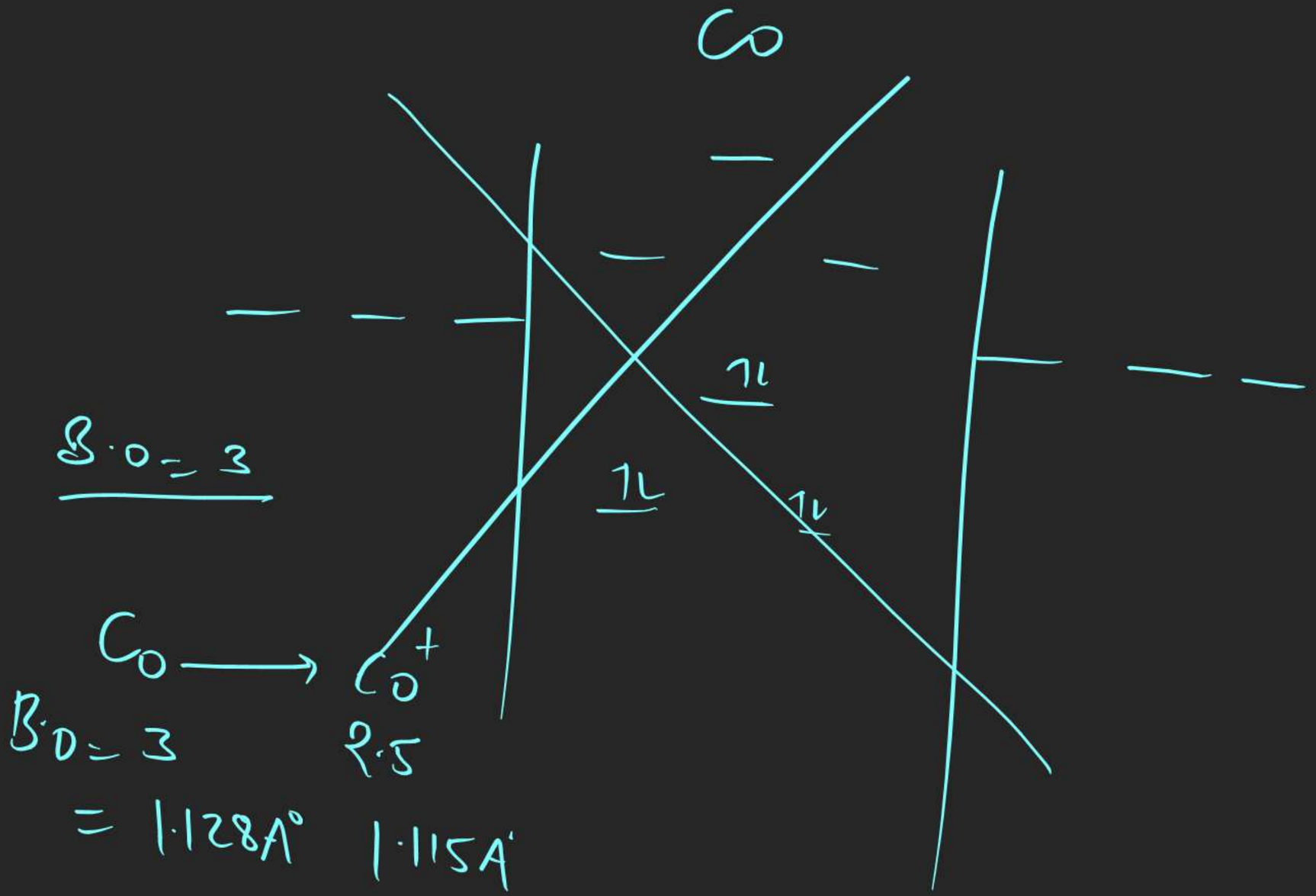

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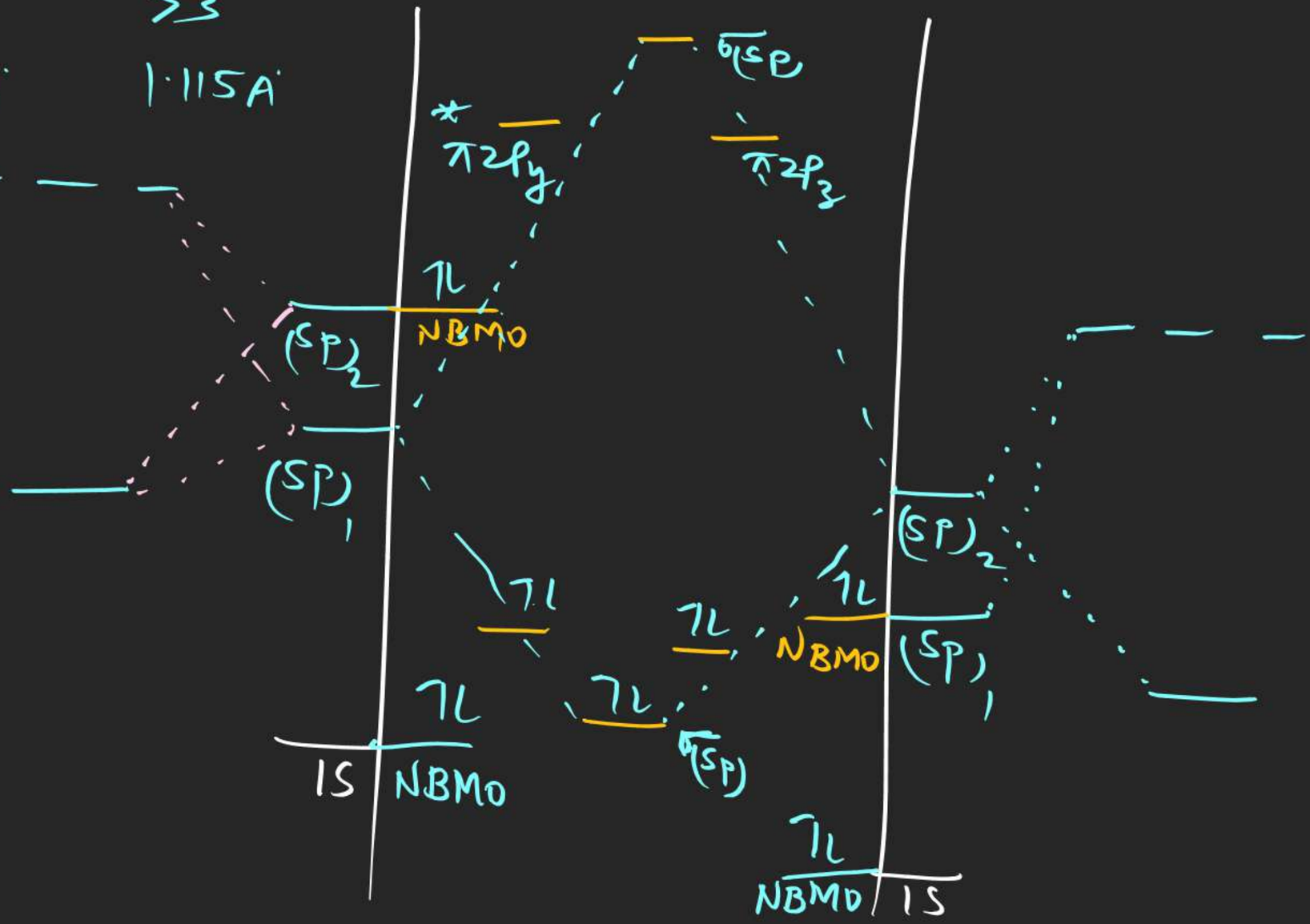
Coulson model

$CO \longrightarrow CO^+$

B.O 3 → >3

B.L = 1.128 Å → 1.115 Å



Order of B.L

one

	NO	NO^+	NO^-	NO^{+2}	NO^{-2}
B.O =	2.5	3	2	2.5	1.5

$$B.L = NO^+ < NO^{+2} < NO < NO^- < NO^{-2}$$