

$$V_{\text{tot}} = V_D + V_F \simeq \frac{p_1}{\mathcal{V}^{2/3}} \left(\sum_j q_{bj} |\phi_{c,j}|^2 - \frac{p_2}{\mathcal{V}^{2/3}} \right)^2 + \sum_j \frac{W_0^2}{2\mathcal{V}^2} |\phi_{c,j}|^2 + V_F(T)$$