

## 5. Exchange effects

$$V_{xc}(r) = \varepsilon_{xc}(n(r)) + n \frac{d}{dn} \varepsilon_{xc}(n(r)) =$$

$$= \underbrace{\left( \varepsilon_x + n \frac{d\varepsilon_x}{dn} \right)}_{V_x} + \underbrace{\left( \varepsilon_c + n \frac{d\varepsilon_c}{dn} \right)}_{V_c}$$

$$\left. \begin{aligned} \varepsilon_x(n) &= -\frac{3}{4} \left( \frac{3n}{\pi} \right)^{1/3} \\ n \frac{d\varepsilon_x}{dn} &= -\frac{1}{4} \left( \frac{3n}{\pi} \right)^{1/3} \end{aligned} \right\} \boxed{V_x = -\left( \frac{3n}{\pi} \right)^{1/3}}$$