

FORMULAS FOR ELECTRON GAS

Note: These formulas apply to the paramagnetic electron gas ($n_{\uparrow} = n_{\downarrow} = n/2$).

Fermi wavevector	k_F
Density of electrons	$n = \frac{k_F^3}{3\pi^2}$
Fermi energy	$\epsilon_F = \frac{\hbar^2 k_F^2}{2m}$
Fermi velocity	$v_F = \frac{\hbar k_F}{m}$
Thomas-Fermi wavevector	$k_s = \frac{2e}{\hbar} \sqrt{\frac{mk_F}{\pi}}$
Density of states at ϵ_F	$n(\epsilon_F) = \frac{mk_F}{\pi^2 \hbar^2}$
Interpartical separation	$r_0 = \frac{(9\pi/4)^{1/3}}{k_F}$
Plasma frequency	$\omega_p = \left(\frac{4\pi n e^2}{m} \right)^{1/2}$