TWO-DIMENSIONAL ELECTRON GAS IN GaAs

FACT SHEET

Units:
- Carrier Density \( N_s \)
- Mobility \( \mu \)
- Magnetic Field \( B \)
- Energy

Effective Mass: \( m' = 0.067m_0 \)
g-factor: \( g = -0.44 \)
Fermi Wavevector: \( k_F = 7.9 \times 10^5 \times N_s^{1/2} \text{ (cm}^{-1}\text{)} \)
Fermi Energy: \( E_F = 3.6 \times N_s \text{ (meV)} \)
Mobility Lifetime: \( \tau = 40\mu \text{ (psec)} \)
Mean Free Path: \( \lambda = 5.4\mu N_s^{1/2} \text{ (\mu m)} \)
Magnetic Length: \( l_0 = 25.7 \times B^{-1/2} \text{ (nm)} \)
Landau Level Degeneracy: \( D = eB/\hbar = 2.42 \times 10^{10} \times B \text{ cm}^{-2} \)

Cyclotron Energy: \( \hbar \omega_c = 20B \text{ (K)} \)
Spin Splitting: \( g\mu_B B = 0.29 \times B \text{ (K)} \)
Coulomb Energy Scale: \( e^2/4\pi\epsilon l_0 = 50 \times B^{1/2} \text{ (K)} \)