Convenient Conversion Factors

Approximate Conversion	Exact value	Formula	Note
1 uA = 300 pH	318 pH	L_J = \Phi_0 / 2 pi I_C	Josephoson inductance
1 GHz = 4 uV = 47 mK	4.11 uV	E = h \nu	Frequency to energy conversion for EM radiation
10 fF = 8 uV = 2 GHz		E = e^2 / 2 C	Charging energy
10 nA = 20 uV = 5 GHz	2 uV	E_J = h/2e * Ic/2pi	Josephson Energy (careful about factors of two?...)
1 K = 150 ueV		\Delta = 1.76 kTc	Superconducting gap as a function of Tc (Al = 1.2K)
10 kOhm = 230 nA		I_c = pi * Delta / 2 Rn	Ic Rn product for a junction with Tc = 10K
10 kOhm = 23 nA		I_c = pi * Delta / 2 Rn	Ic Rn product for a junction with Tc = 1K
100 uV = 1 K	1.16 K (86 uV)	E = e / k_B	
1 cm = 1 pF	1.11 pF	C = 4 \pi \epsilon d	Self capacitance of a sphere to infinity
100 aF = 0.80 mV		E = e^2 / 2 C	Charging energy
1 ns = 30 cm	30 cm	d = c / t	Speed of light
1 pF = 160 nV, 16 mV = 10 aF		V = q / C	Voltage on capacitor for a single electron
1 cm = 1 nH			Self inductance of wire per unit length?
1V @ 100 nm = 0.5 x 10^11 e/cm^2	0.55 x 10^11	Q/A = \epsilon V / d	Parallel plate capacitor, \epsilon = 1
1 T = 25.7 nm		l_B = (\hbar / eB)^1/2	Magnetic Length
1 T = 2.42 x 10^10 cm^-2		N_0 = 2eB/h	LL degeneracy (2D)
1 T = 20.0 K = 1.72 mV		\hbar e B / m*	Cyclotron Energy (m* = 0.067)
1 T = 0.29 K = 25 uV		g \mu_B B	Zeeman Splitting in GaAs
1 T = 50 K		e^2 / 4 \pi \eps l_B	Coulomb energy scale in QHE
1 mV = 3e10 e/cm^-2			DOS of GaAs 2DEG (m = 0.067)
0.48 mV = 1 e/um		8 / 3 \pi \gamma_0 a_0	DOS of a nanotube
100 nm = 10 uV	9.28 uV	En = pi^2 hbar^2 n^2 / 8 m a^2	1D confinement energy for free electrons (n=1), hard wall L = 2a
100 nm = 130 uV	132.57 uV	En = pi^2 hbar^2 n^2 / 8 m a^2	1D confinement energy for electrons in GaAs (m = 0.07) (n=1)
100 nm = 19.4 mV		E = hbar v_F / 2	1D confinement energy in a carbon nanotube
50 Ohm = 0.9 nV/rHz		v_n = sqrt(4kTR)	Johnson noise of a 50 ohm resistor at RT
1 nm = 0.2 mV/T		mu_orb = e v_F d / 4	Orbital magnetic moment of a nanotube
1 nA = 2 uV = 23 mK		E_J = hbar Ic / 2e	Josephson energy

1 kOhm = 580 uV = 6.7 K	E_J = R_Q / 4 R_N * \Delta	E_J in terms of R_N for Aluminium (3.25 kOhms / R_N * \Delta)

Superconducting gaps

	Tc	Gap (\Delta = 3.5/2 Tc)
Al	1.2K	180 uV
Re	2.4K	360 uV
ReMo	10K	1.5 mV
MgB2	35K	5.2 mV

Raman spectroscopy units

1 cm-1 = 124 uV
1000 cm-1 = 124 mV

Energy, frequency, time, and current

Energy	Frequency	Time	Temperature	Current	Magnetic Field (g=2)
1 mV	**243 GHz**	**4.11 ps**	**11.6 K**	**39.1 nA**	**8.6 T**
1 mV	200 GHz	4 ps	10 K	40 nA	10 T
100 uV	20 GHz	40 ps	1 K	4 nA	1 T
10 uV	2 GHz	400 ps	100 mK	400 pA	100 mT
1 uV	200 MHz	4 ns	10 mK	40 pA	10 mT
0.1 uV	20 MHz	40 ns	1 mK	4 pA	1 mT
0.01 uV	2 MHz	400 ns	0.1 mK	400 fA	100 uT
0.001 uV	200 kHz	4 us	0.01 mK	40 fA	10 uT

1 pA = 6 MHz = 25 uV

Misc Stuff

1 mL lHe = 1 mW * hour Latent heat of liquid helium
1 L STP He = 2 mL liquid
Lattice density ~ 1e22 cm^3
1bar = 14.5 psi
1L liq He = 26.73 cu ft STP = 757 L STP
1 cu ft = 28.31 L
1 hp = 750 W

1 ft = 30.48 cm
1 mbar = 101.3 Pa = 1 cm H20
1 inch H20 = 2.5 mbar =
1 psi = 6.7 kPa = 66 mbar

Constants	**Value**
flux quantum h / 2e	
h	6.62 x 10^-34 J s
hbar	1.05 x 10^-34 J s
resitance quantum e^2 / h	25.812 kOhm
Bohr magneton	58 uV / T

2DEG Fact Sheet

Nanotube Density of States

Up