Low temperature operation

Single electron charging energy

$E_C = e^2/C$, ($C=8e_re_oR$, disk)
R = 10 nm E_C = 30 meV
R = 100 nm E_C = 3 meV

Thermal energy

T = 300 K $k_BT \sim 26$ meV
T = 4.2 K $k_BT \sim 0.35$ meV
T = 30 mK $k_BT \sim 2.6$ ueV

Operation is at low temperatures

Dilution refrigerators reach temperatures below 10mk