Vorlesung Quantum Transport – Superconductivity (2)

1. Superconducting tunnel junctions
    - NIS
    - SIS
2. SQUID
3. Cooper pair box
4. Real world Josepshon junction (RCSJ model)
5. Quantum effects in Josepshon junctions
6. Superconducting Qbits
    - Charge Qbit
    - Flux Qbit
    - Phase Qbit

Literature

T. Heikkilä: The Physics of Nanoelectronics

M. Tinkham: Superconductivity

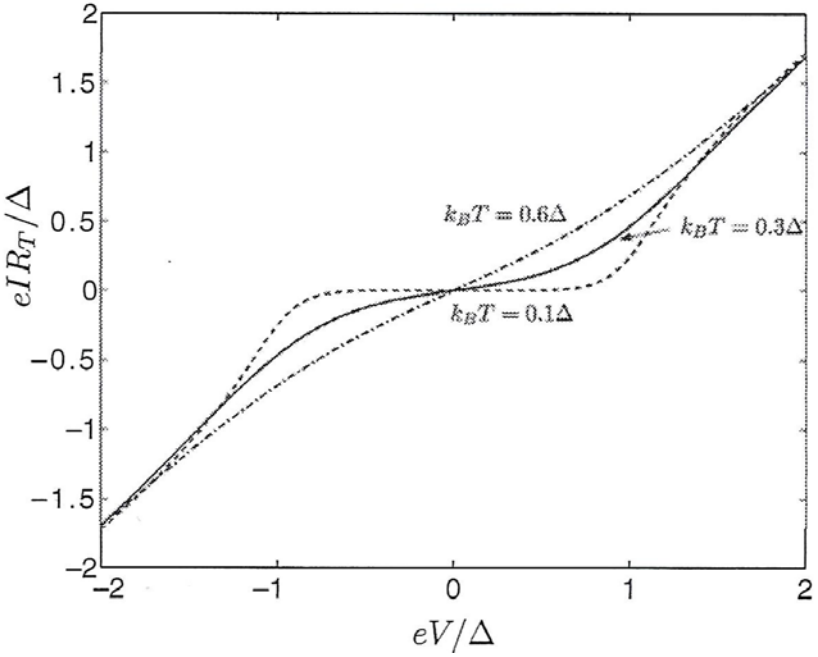
Y. Nazarov, Y. Blanter: Quantum transport

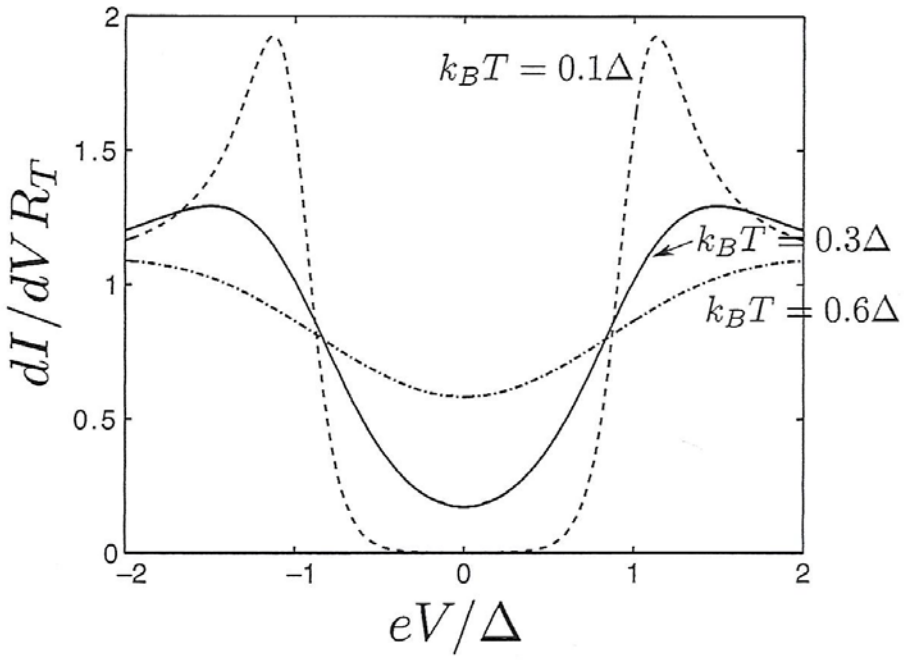
Announcement

Next week‘s lecture:

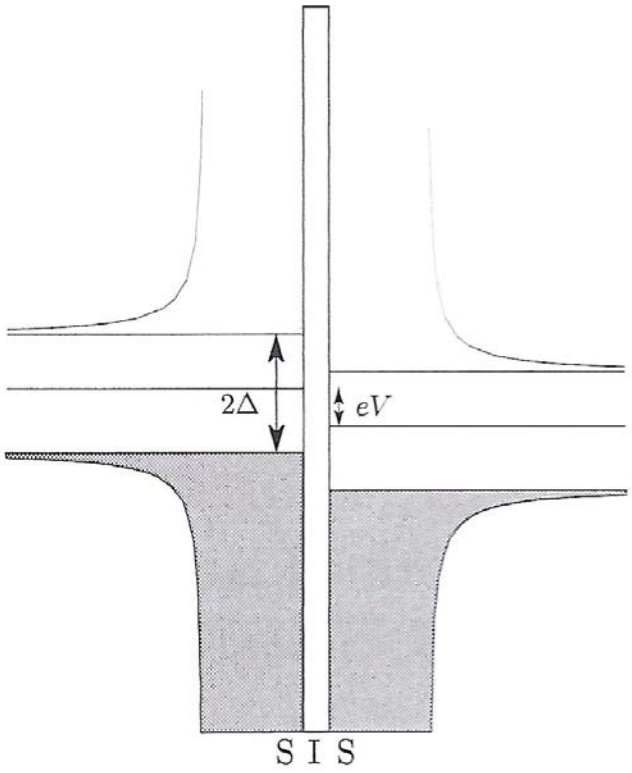
Tuesday, 12.5.2015, 15:00-17:00

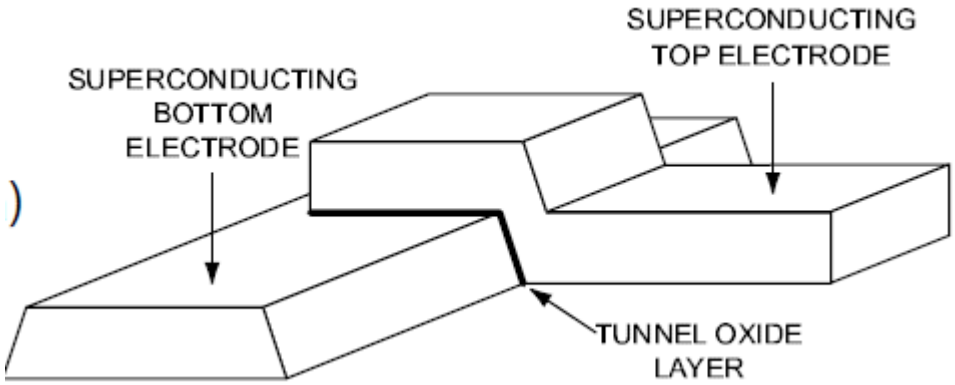
NIS junctions

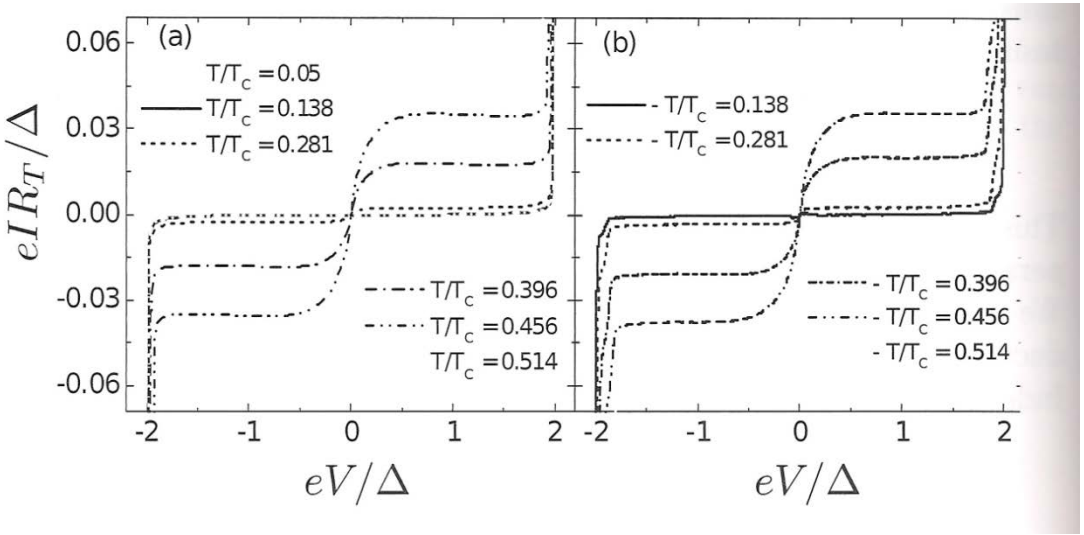




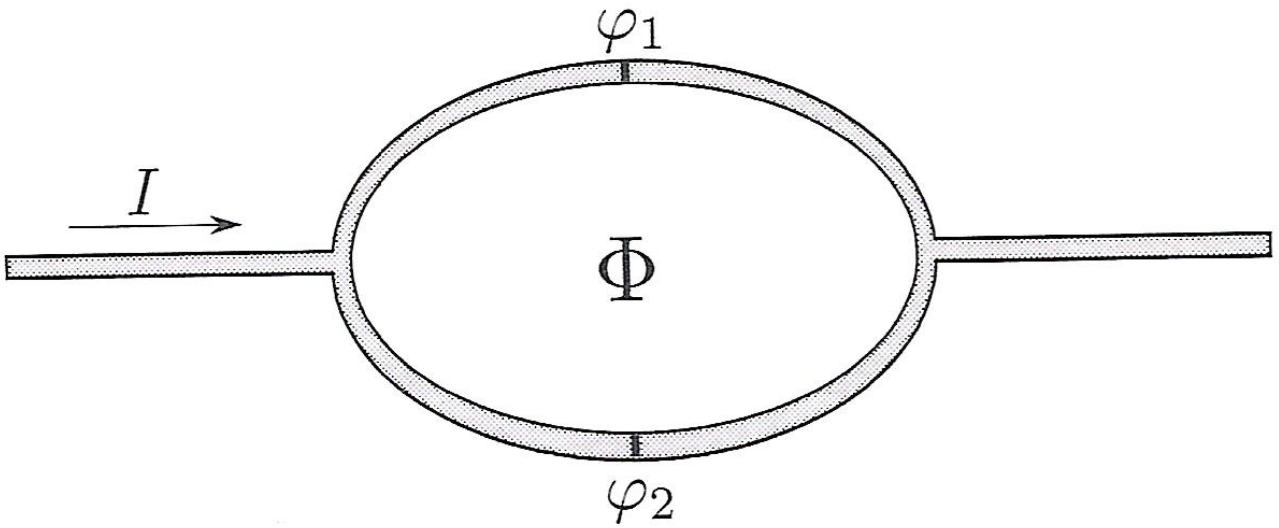
SIS junctions



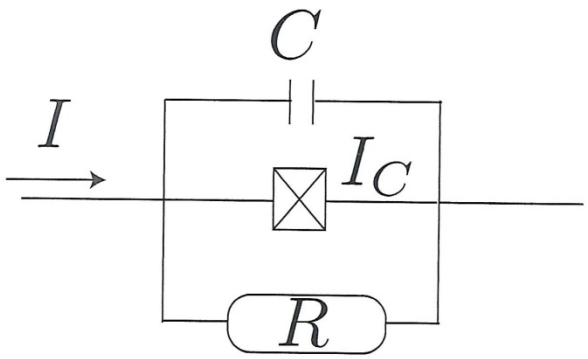


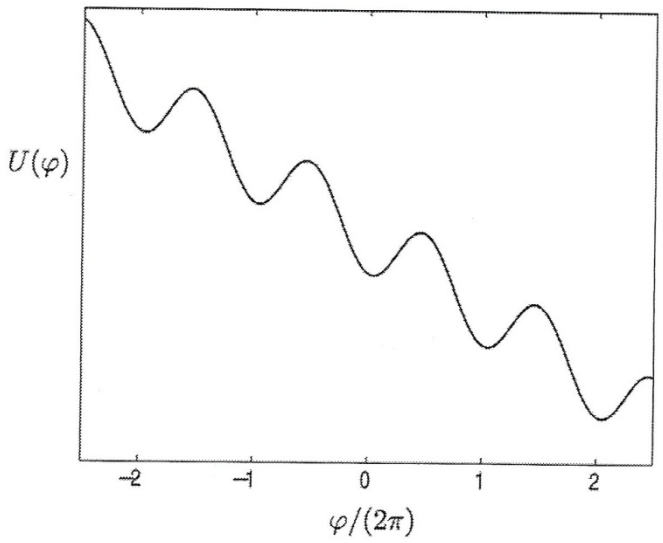


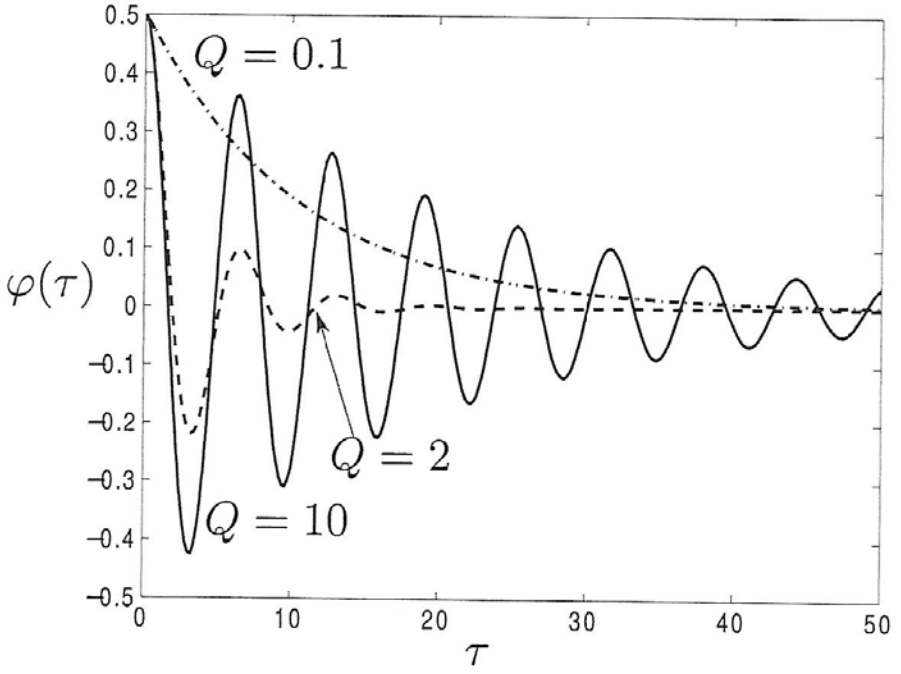
SQUID



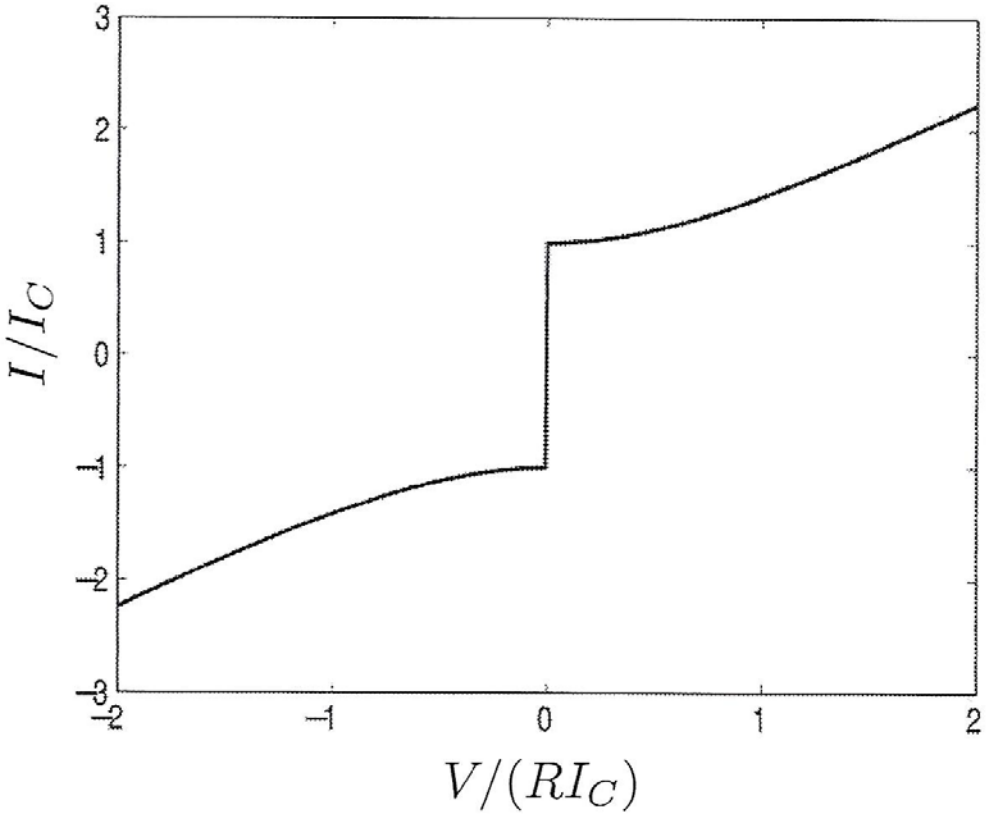
Real world superconducting junctions: RCSJ model





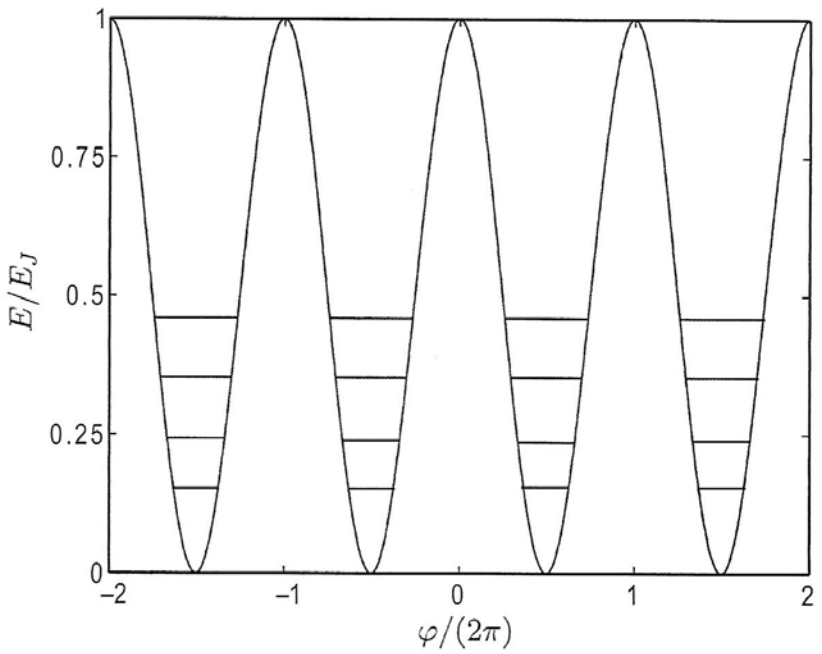


Overdamped junction

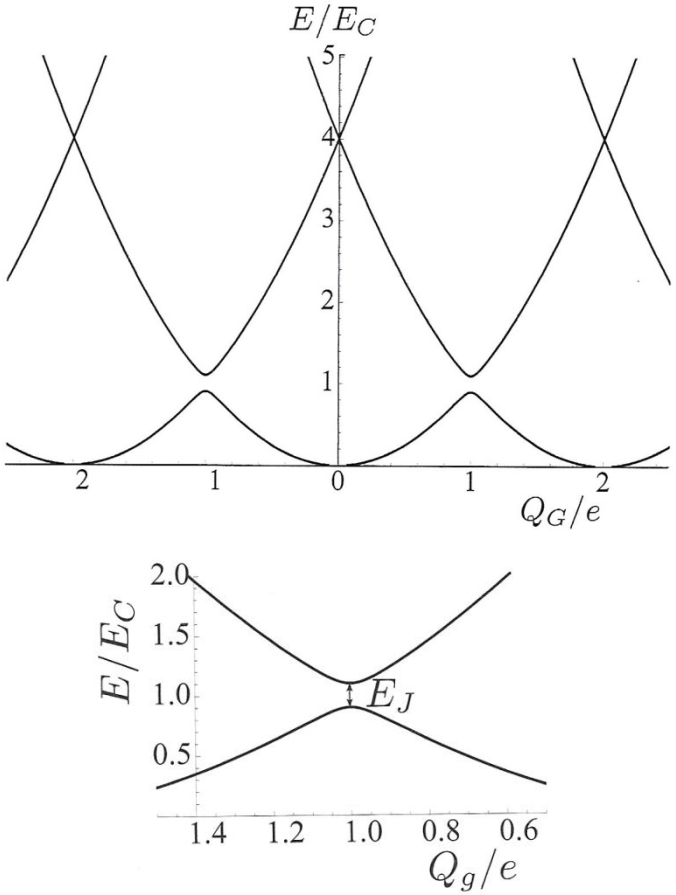


Quantum effects

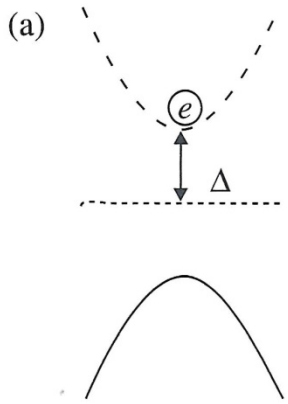
tight binding



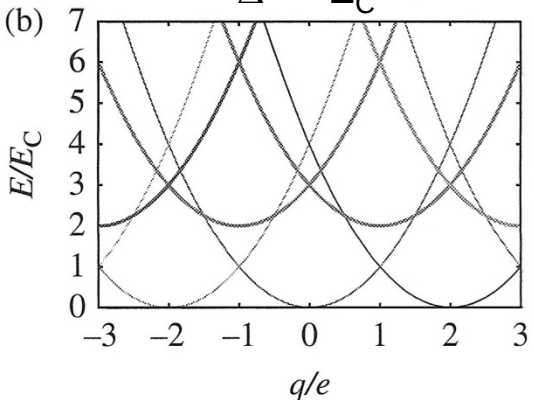
free electron limit



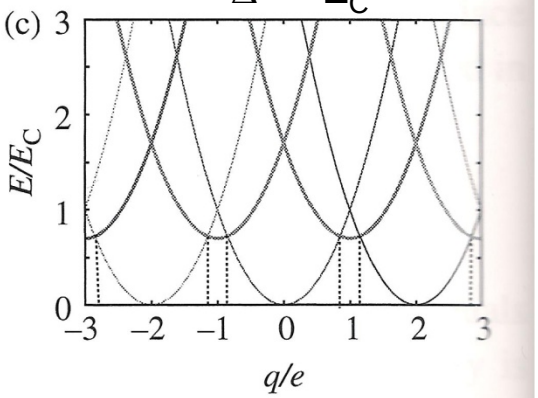
parity effects

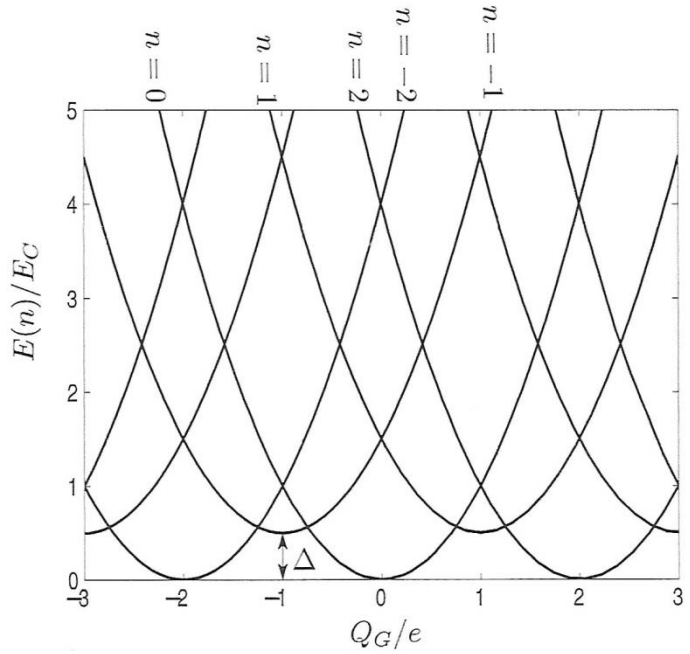


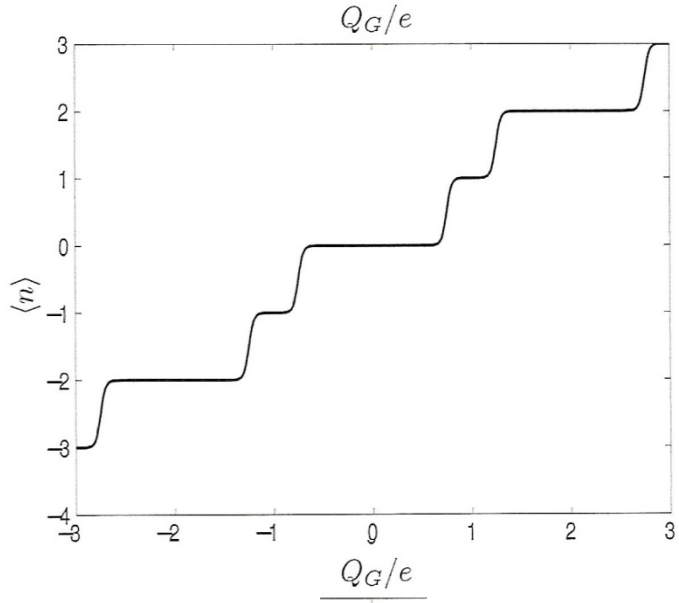
Δ > E_C



Δ < E_C

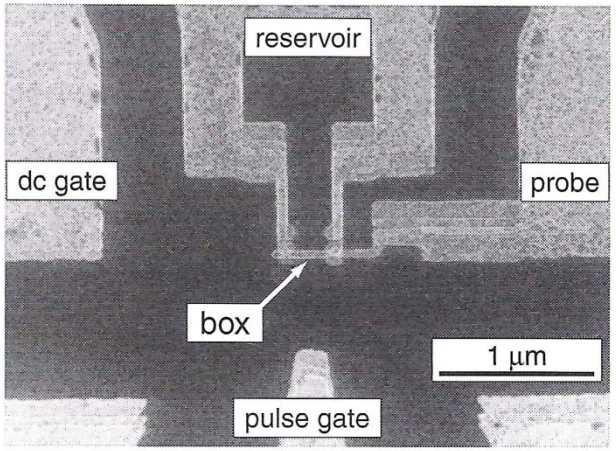




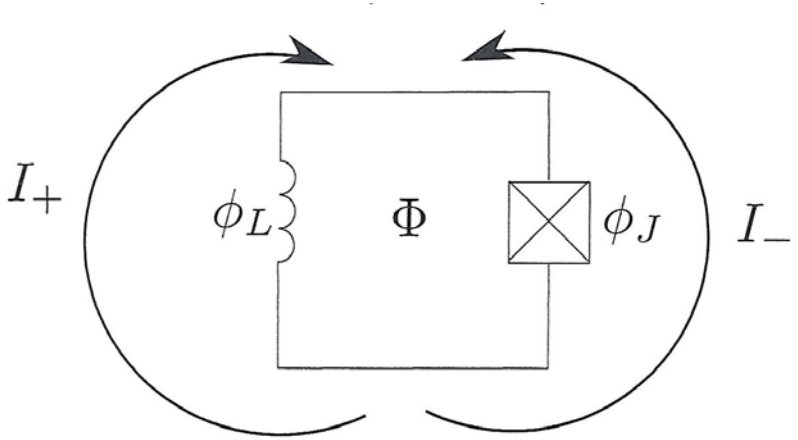


Superconducting Qbits

charge qbit



flux qbit



Nakamura et al., Nature 398, 786 (1999)

transmon