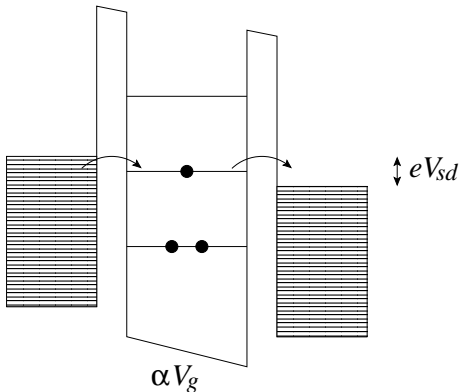## Lecture 7

Conduction through quantum dot: current flows only when a trapped electron state lies in window eV_{sd} between Fermi energies of the conductors on either side

→ resonant tunnelling occurs

- gate voltage V_g: use to raise or lower floor of well

αV_g

eV_{sd}

$V_{sd} = 0$: current flows only when state lines up exactly with both Fermi energies ($\rightarrow$ discrete values of V_g)

- large gaps at magic numbers (start filling new shell)
- small gaps for each electron added to same shell
- $\rightarrow$ Coulomb blockade – like screening in real atoms

Plot of conductance as a function of V_{sd}, V_g

- empty "diamonds" where no state lies in the window and so no current can flow