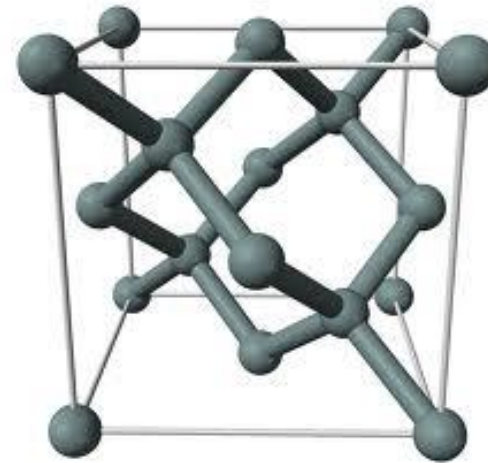


Statistical Mechanics of a Single Dopant Atom in Silicon

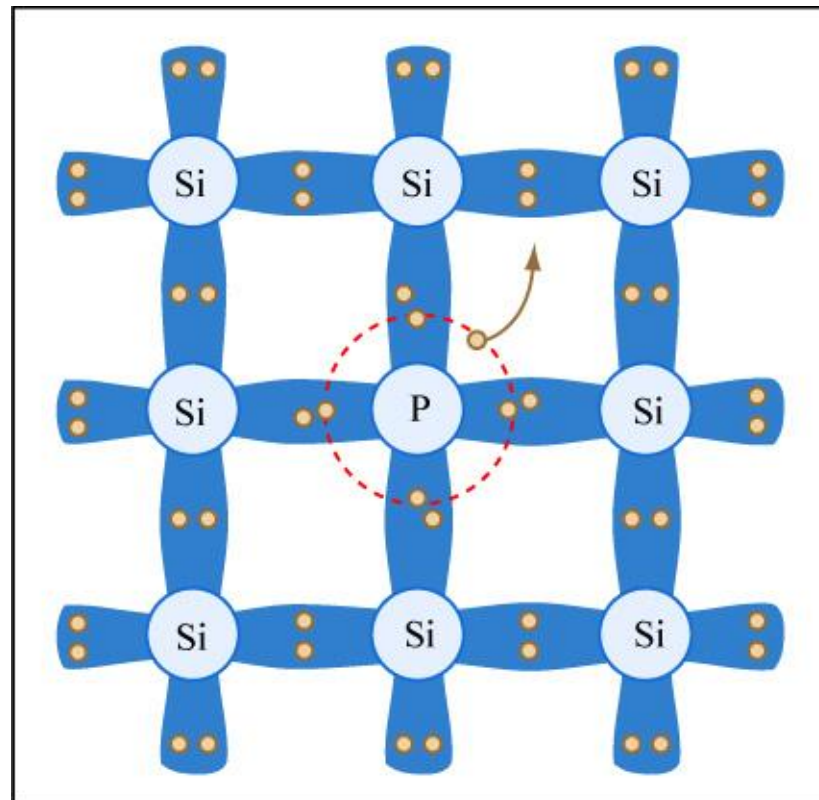
	IIIA	IVA	VA	VIA	VIIA	2
	5 B	6 C	7 N	8 O	9 F	10 He
	13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe

Si: (Ne) $3s^2 3p^2$
P: (Ne) $3s^2 3p^3$



Si
Crystal
Structure

Phosphorous
Dopant
in Si



Bohr model of
electron orbiting
P nucleus

Freeze-out of Dopant Carriers in Semiconductors at Low Temperature

