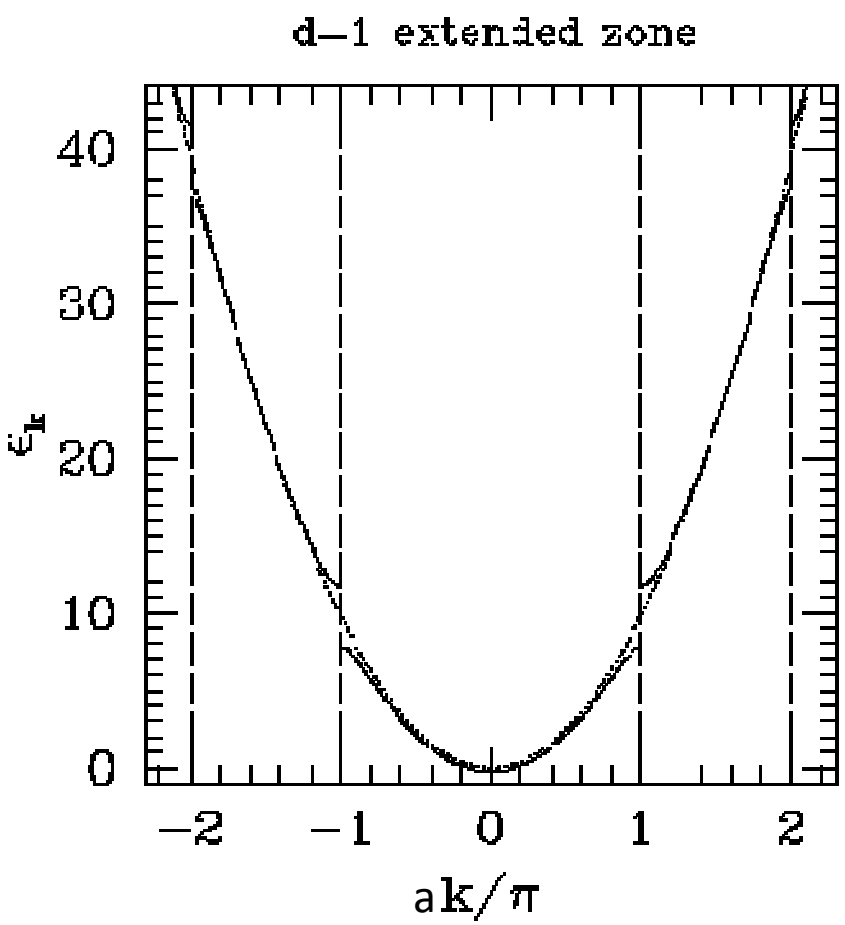
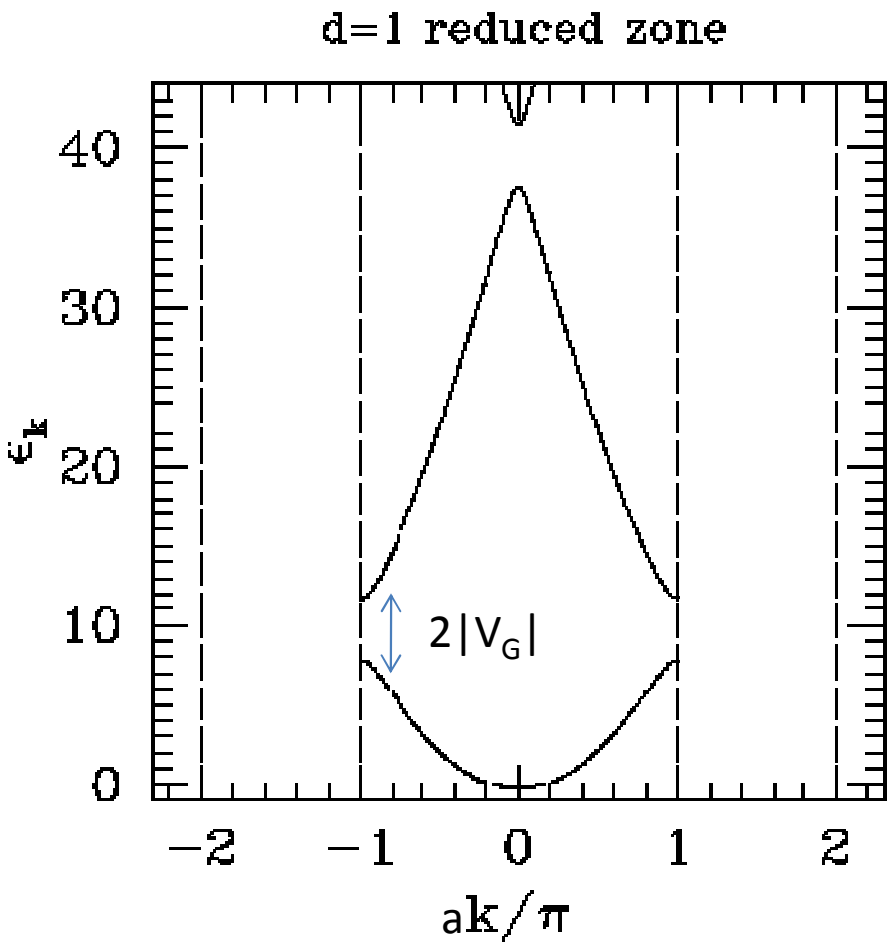
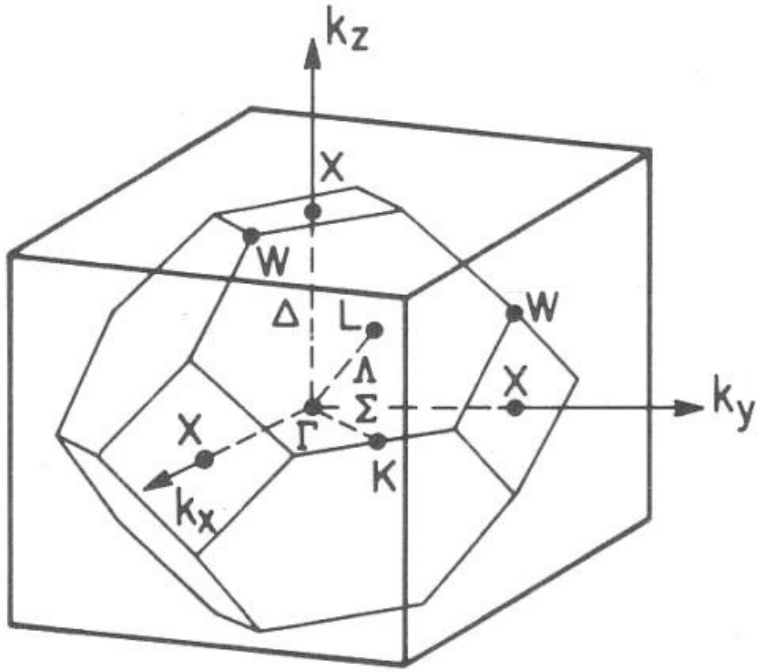
Slides
Condensed Matter Physics
Lecture 15


d=1 extended zone
40
30
20
10
0
ϵ_k
−2
−1
0
1
2
ak/π

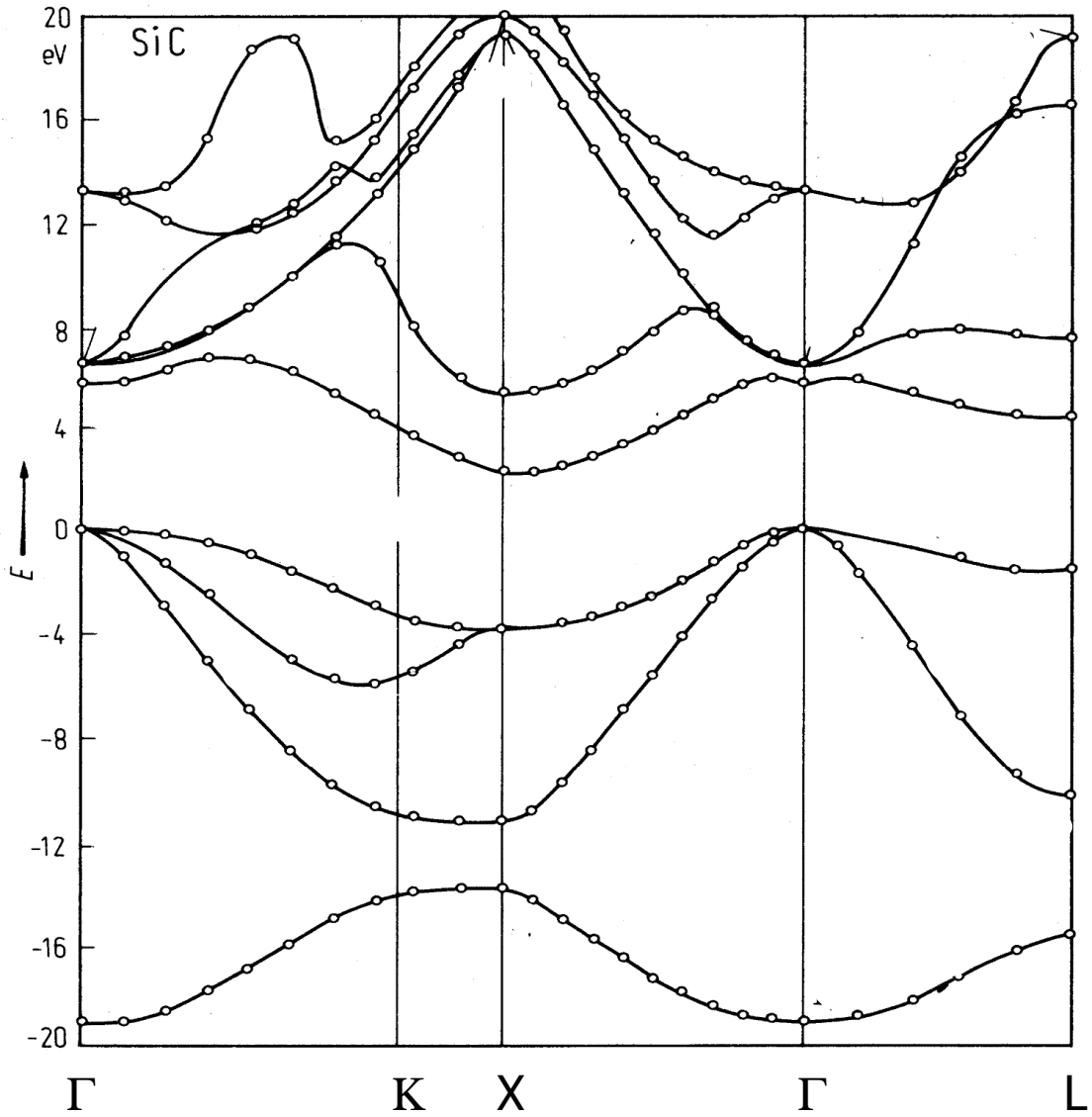

d=1 reduced zone
40
30
20
10
0
ϵ_k
$2|V_G|$
−2
−1
0
1
2
ak/π

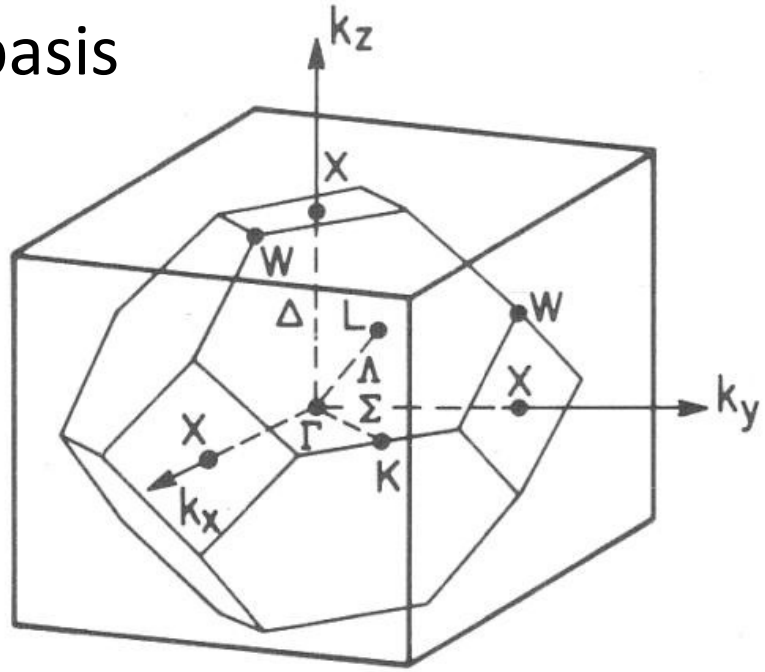
1st Brillouin Zone of an FCC lattice
=same shape as Wigner Seitz
cell of a BCC lattice

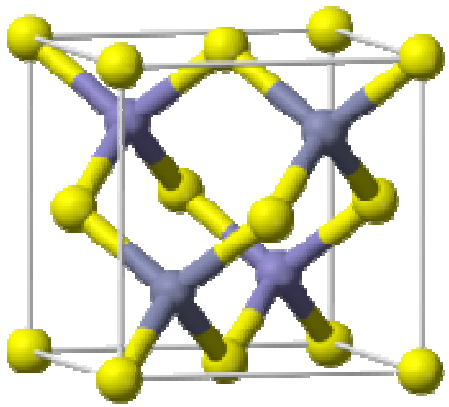


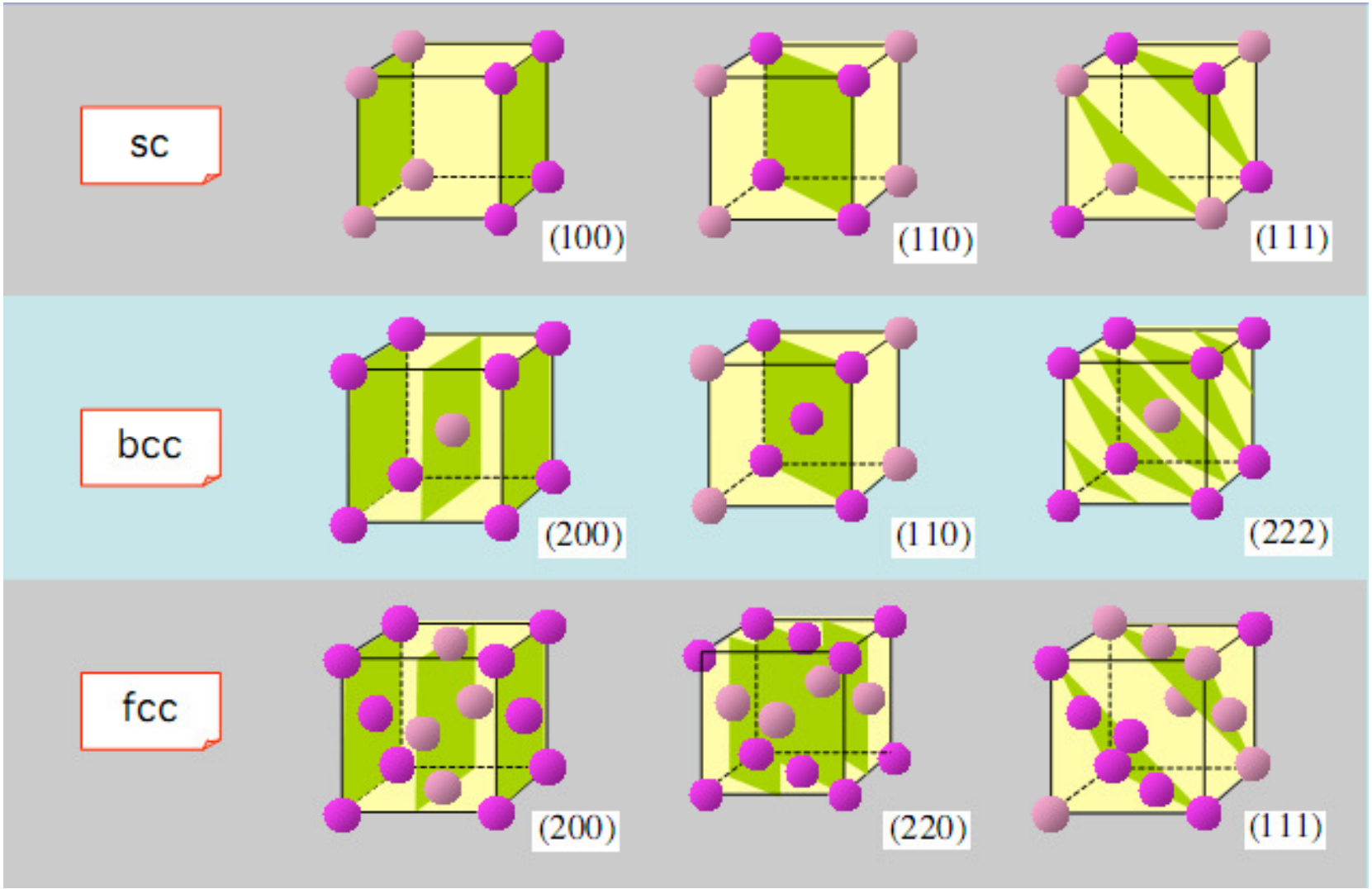
Silicon Carbide = FCC with a 2-atom basis

Si @ [0,0,0] and C @ [¼, ¼, ¼]



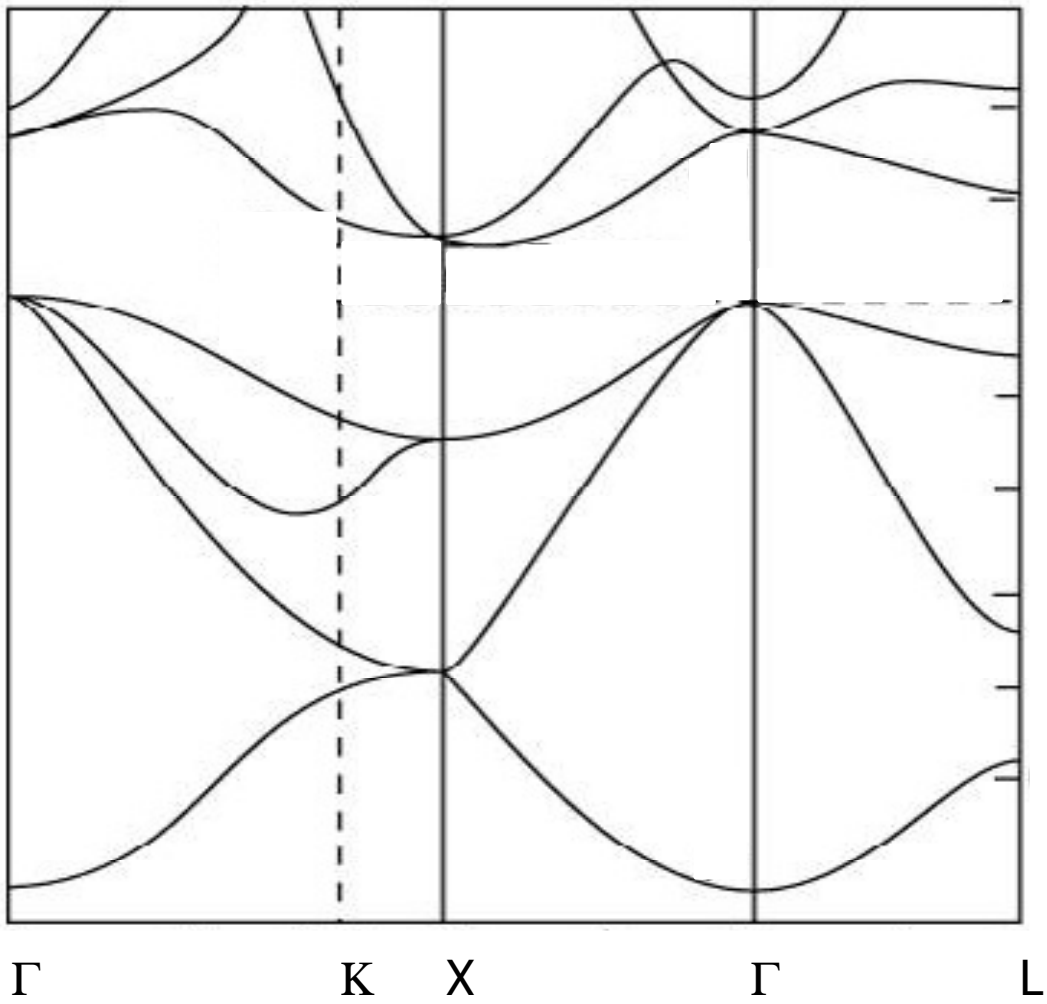


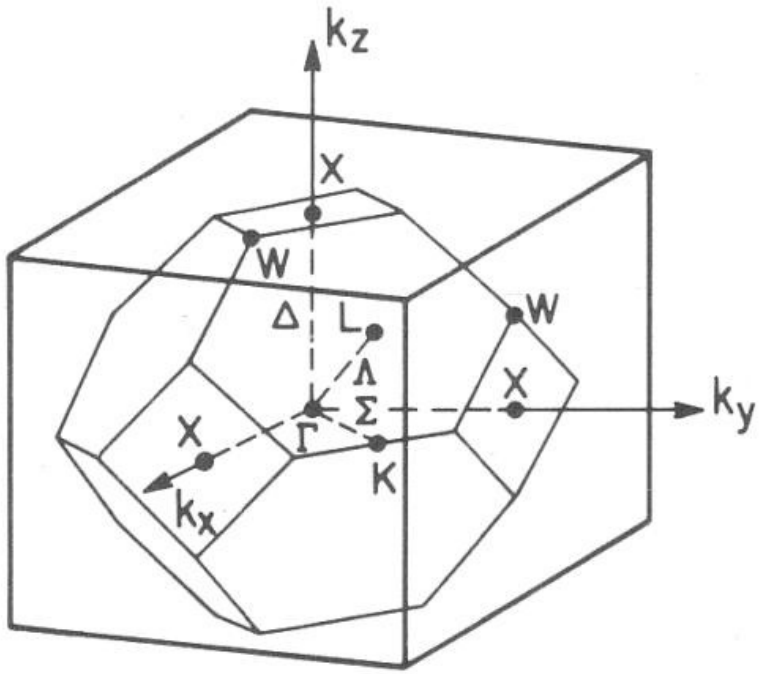


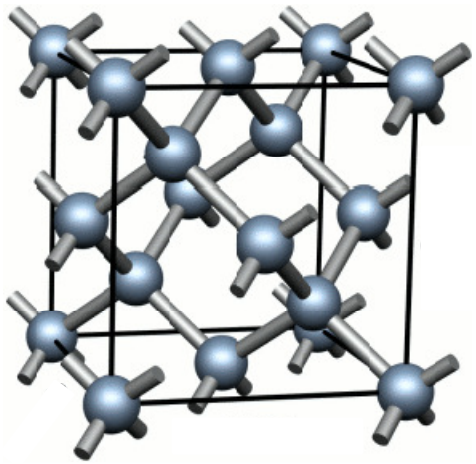

sc
(100)
(110)
(111)
bcc
(200)
(110)
(222)
fcc
(200)
(220)
(111)

Silicon = FCC with a 2-atom basis

Si @ [0,0,0] and Si @ [¼, ¼, ¼]



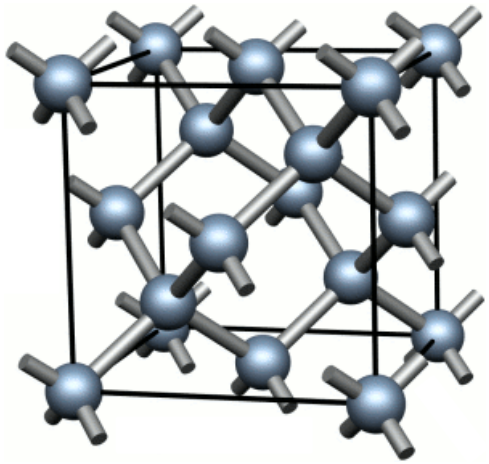


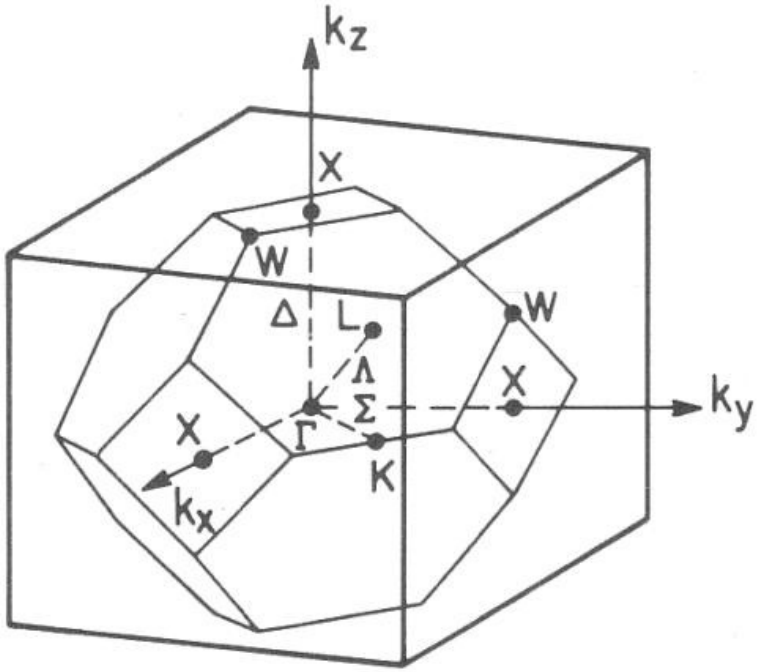


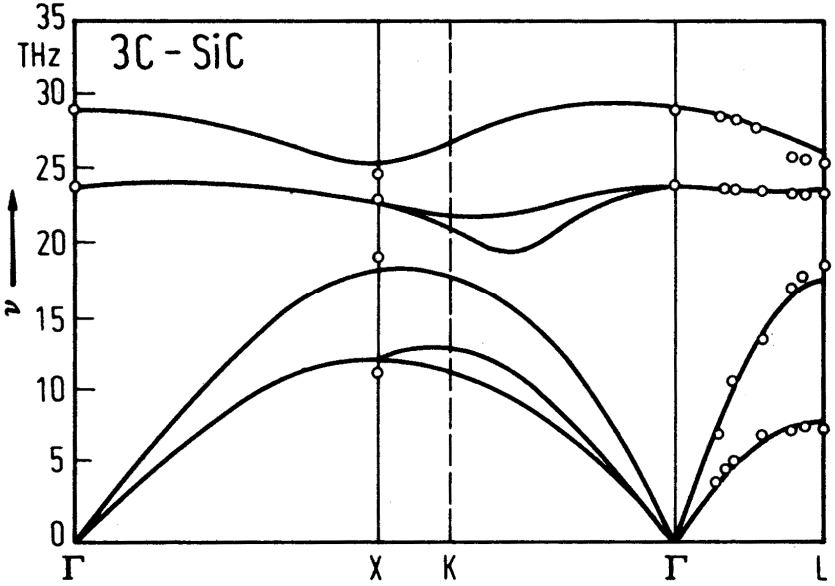
No backscattering at X-point

Silicon = FCC with a 2-atom basis

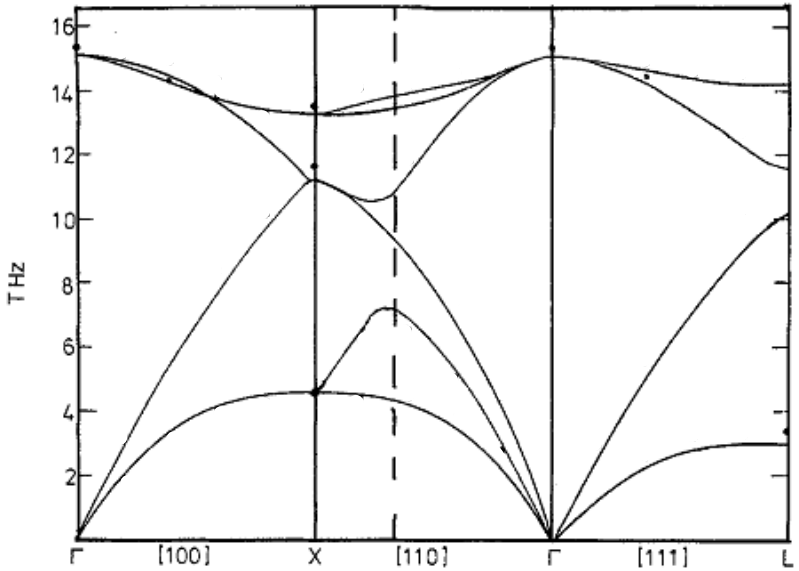
C @ [0,0,0] and C @ [¼, ¼, ¼]







Silicon Carbide Phonons



Silicon Phonons