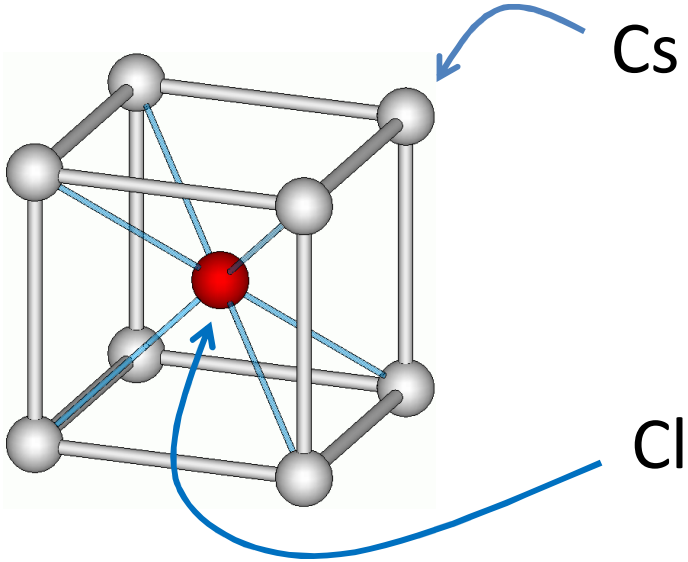
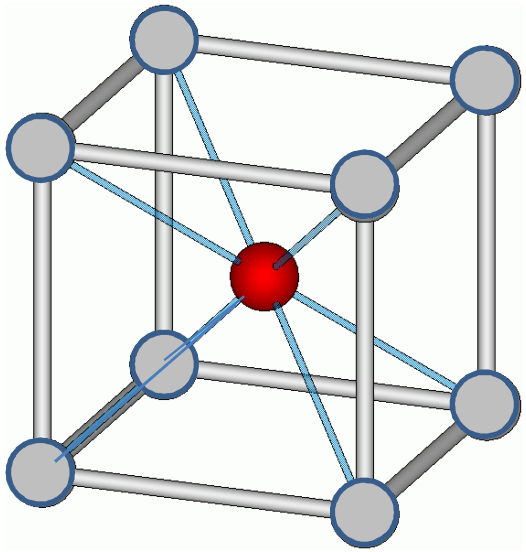
Slides
Condensed Matter Physics
Lecture 12



Cesium Chloride (CsCl): A simple cubic Lattice with a Basis

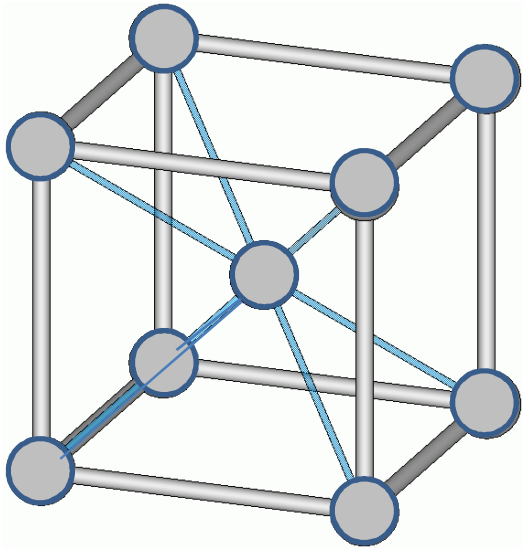
Basis:

Cs at[0, 0, 0] (i.e., on the simple cubic)
Cl at [½, ½, ½] (i.e., in the middle of each cube)



CsCl =Simple Cubic
with Basis

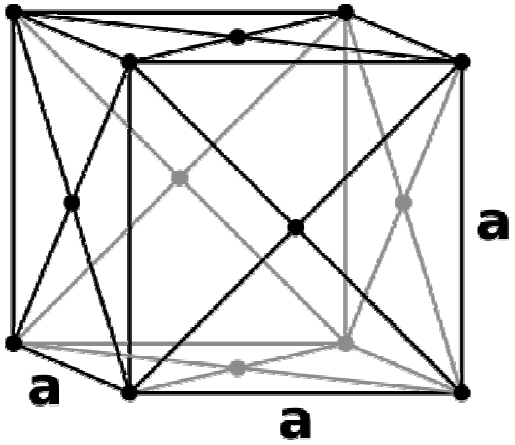
Cs at [0, 0, 0]
Cl at [½, ½, ½]

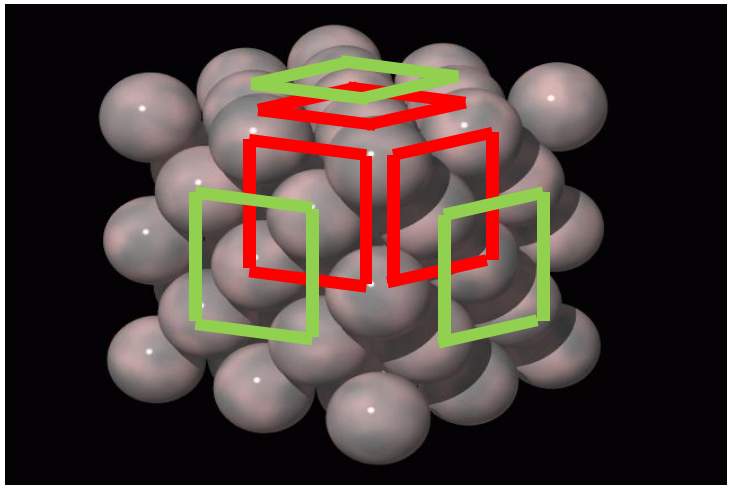


Cs = Simple Cubic
with Basis
= BCC

Cs at [0, 0, 0]
Cs at [½, ½, ½]

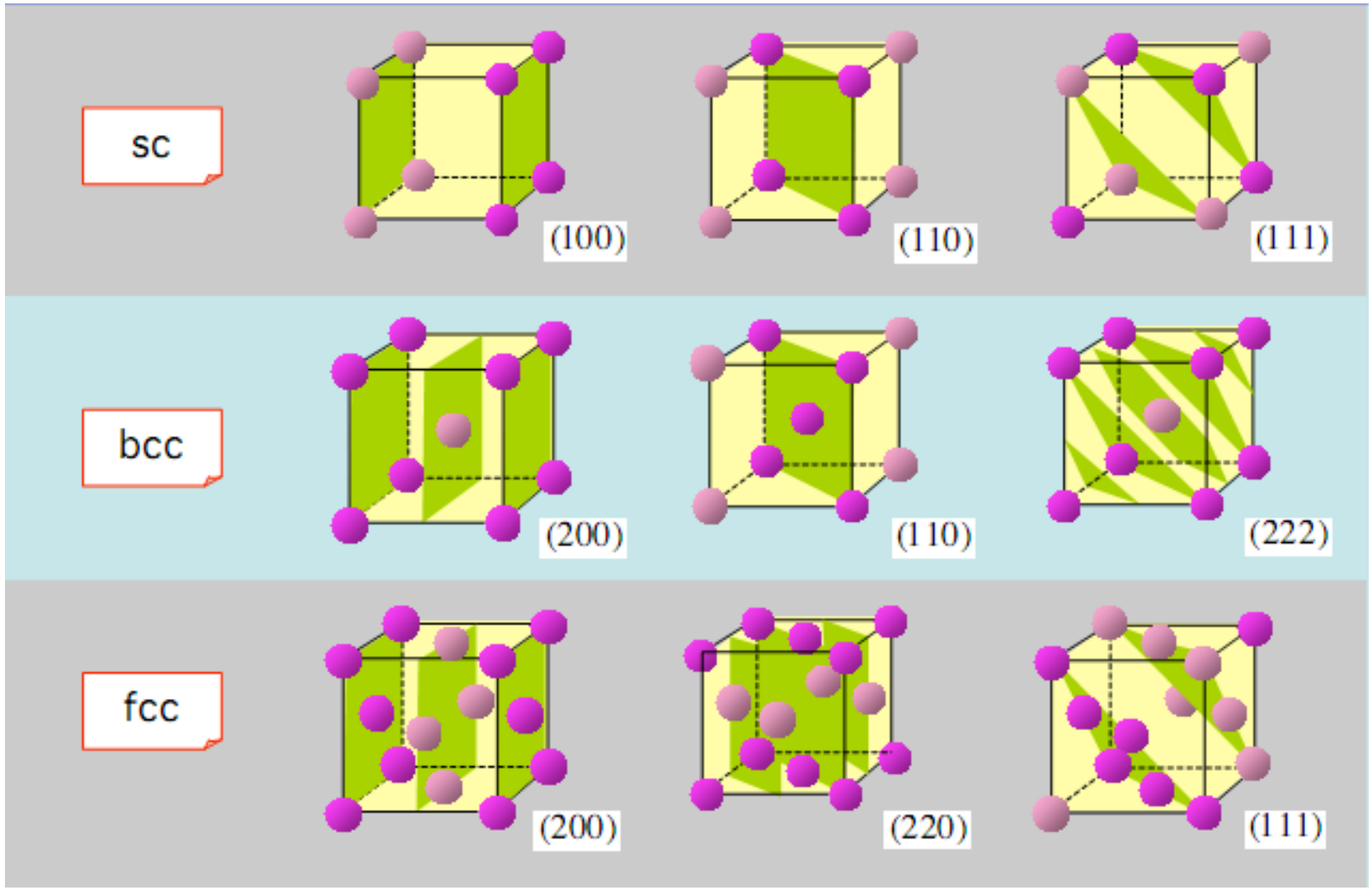
Unit cell of <u>Face Centered Cubic</u> Lattice (FCC) (Notated cubic-F)

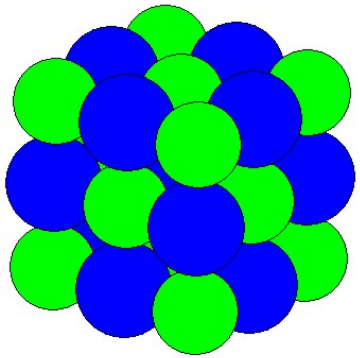


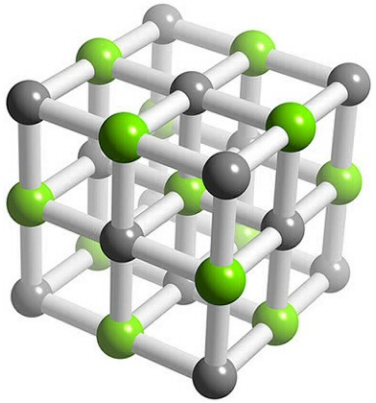


FCC = Simple Cubic with Basis

Basis = [0,0,0], [½, ½, 0], [½, 0, ½], [0, ½, ½]


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





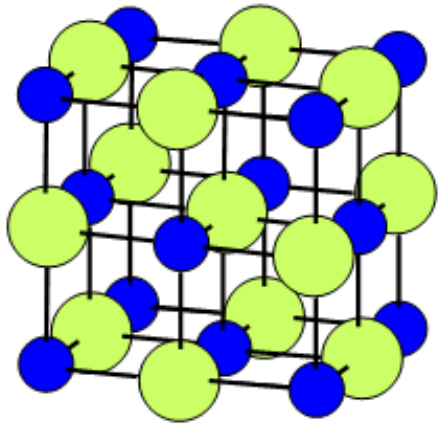
sodium chloride (NaCl)

lattice: cubic F

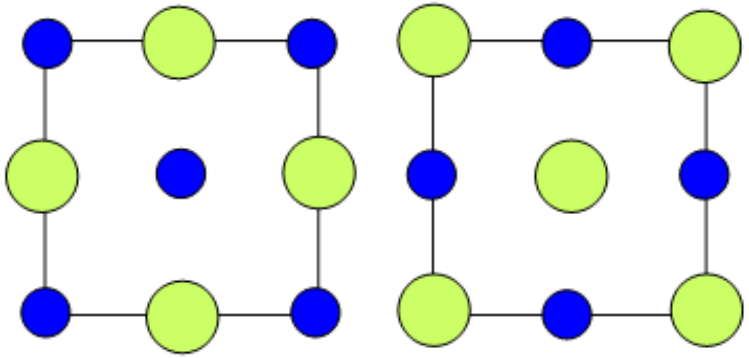
basis :

Na 000

Cl ½½½



Plan view



$z = 0$ layer $z = ½$ layer

Na forms FCC lattice.

Cl is displaced (1/2,1/2,1/2) from each Na

The Rutherford-Appleton Lab in Oxfordshire

Synchrotron X-ray Source

Spallation Neutron Source