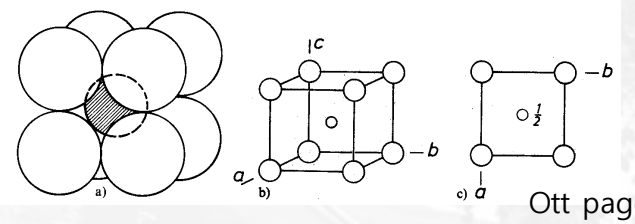
PROJECTION

Krawitz, Page 48 ~ 62
Cullity 3rd edition, Page 70 ~ 86
Hammond, Chapter 12

three dimensional objects → flat surfaces

- parallel projection



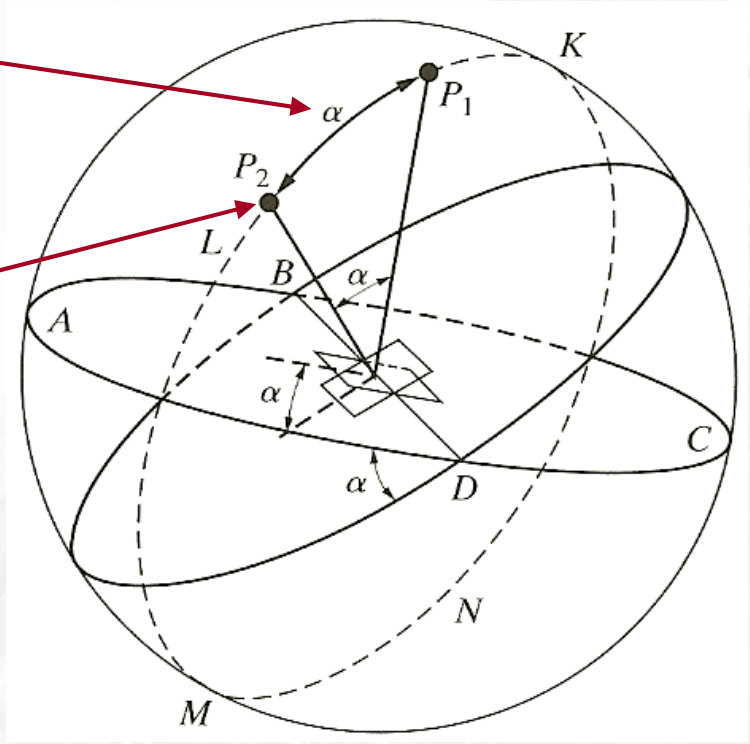
Ott page 23

- **stereographic**- angular relationship between lattice planes and directions
- gnomonic
- orthographic

Angle between two planes

angle b/w the normals

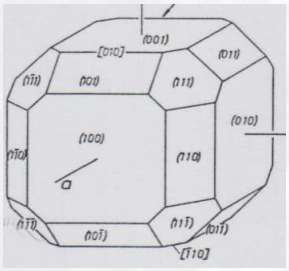
pole



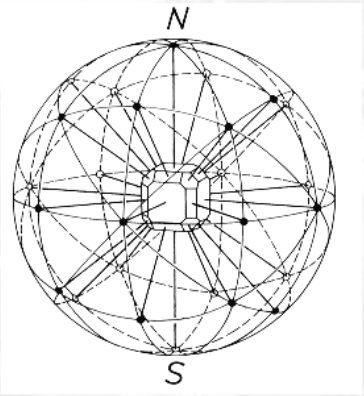
Cullity page 71

Stereographic projection

- Place a crystal at the center of the sphere.
- Draw normal to each faces from the center of the sphere.
- Cut the surface of the sphere in the indicated points. → poles of the faces
- Great circles- circles whose radii are that of the sphere
  - ✓ Those faces whose poles lie on a single great circle → a single zone
  - ✓ Zone axis ⊥ plane of the great circle
- Project a line from each poles in the northern hemisphere to the south pole (the opposite is possible).
- Mark the intersection on the equator plane.



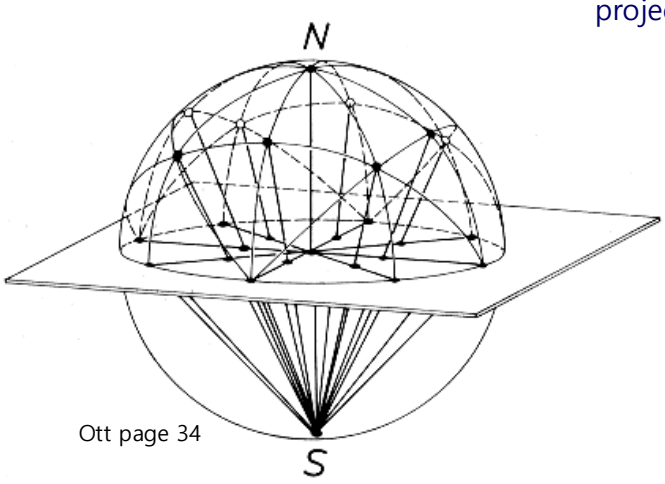
Ott page 27



Ott page 34

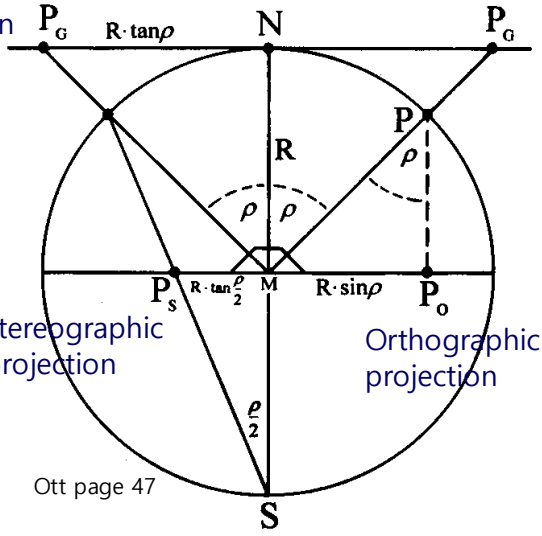
Stereographic Projections

- project a line from each of the poles in the northern sphere to the south pole.
- mark its intersection with the plane of the equator with a point •.
- Poles in the southern hemisphere – projected to the north pole → O



Ott page 34

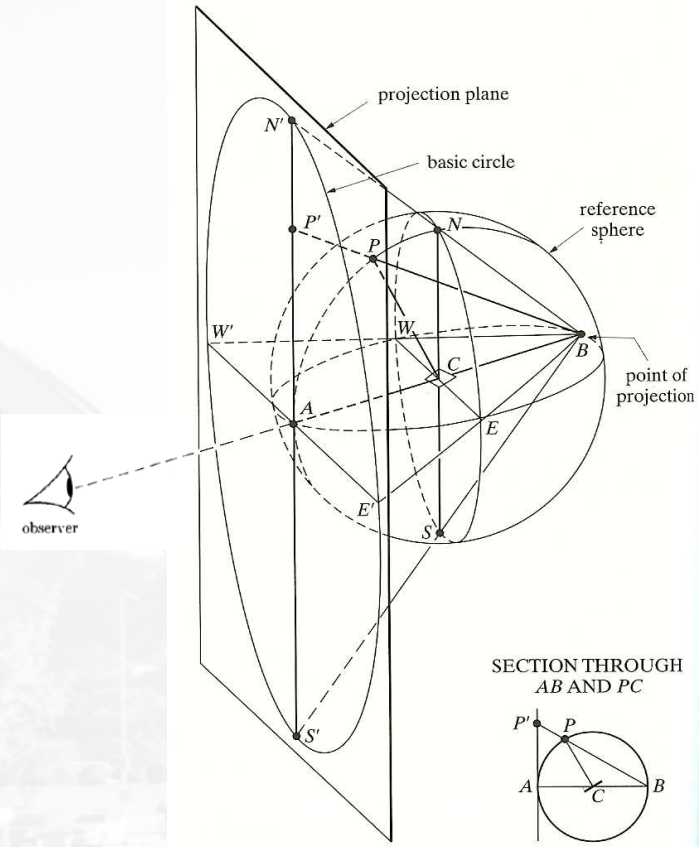
Gnomonic projection



Ott page 47

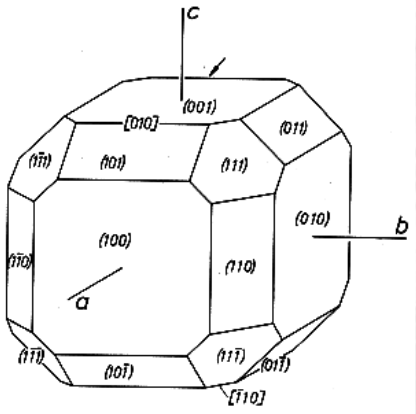
Projection from sphere to plane

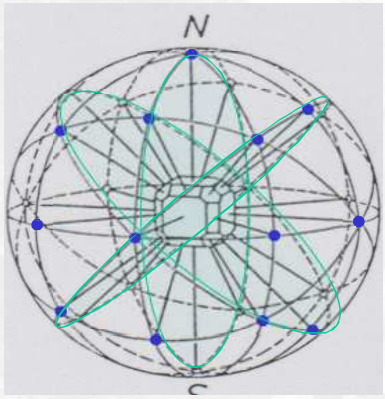
- Projection of spherical information onto a flat surface
- Equal area projection (Schmid projection)
- Equal angle projection (Wulff projection) – more common in crystallography

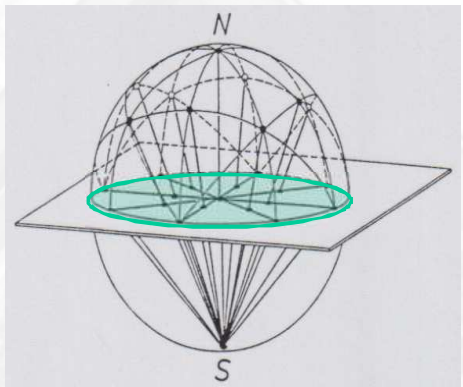


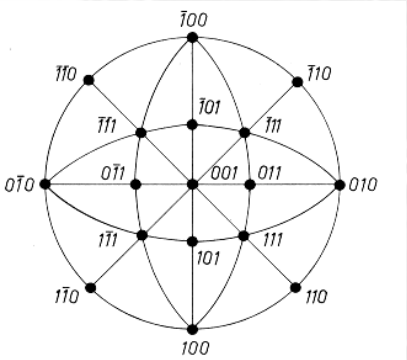
Stereographic projection

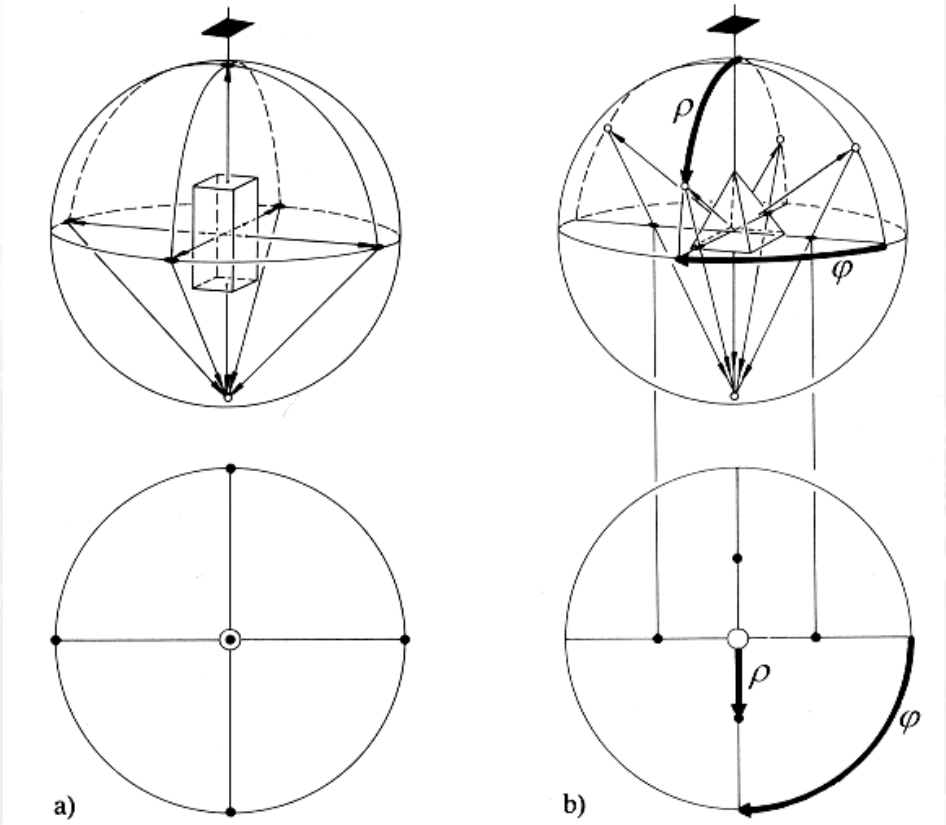
- those faces whose poles lie on a single great circle → a single zone
- zone axis ⊥ plane of the great circle

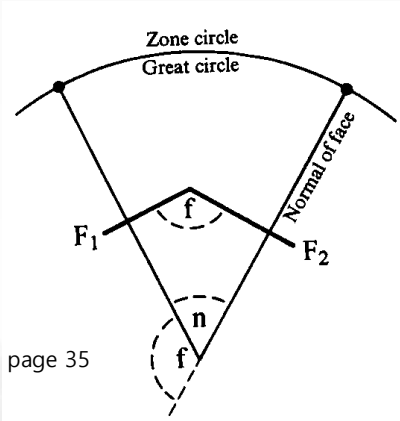




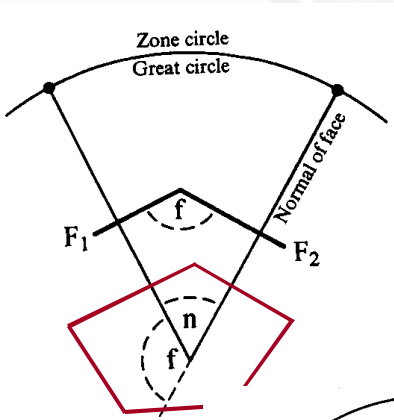






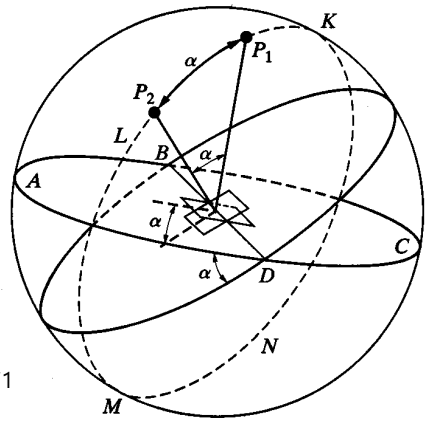


Ott page 35



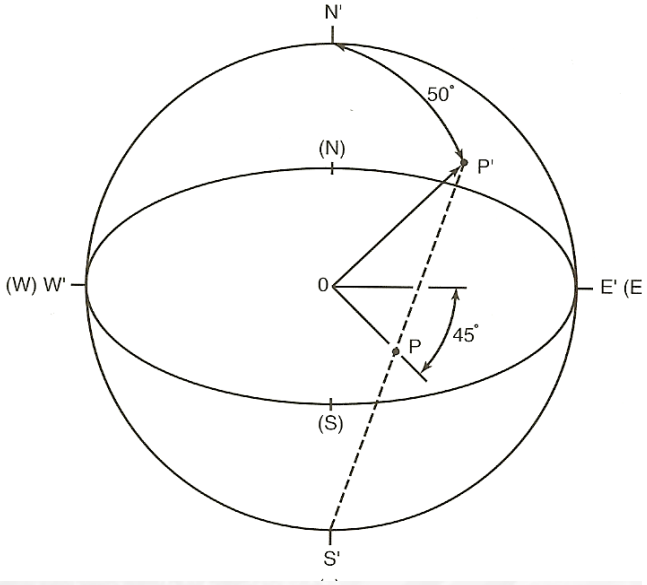
n = angle b/w poles = angle b/w normals

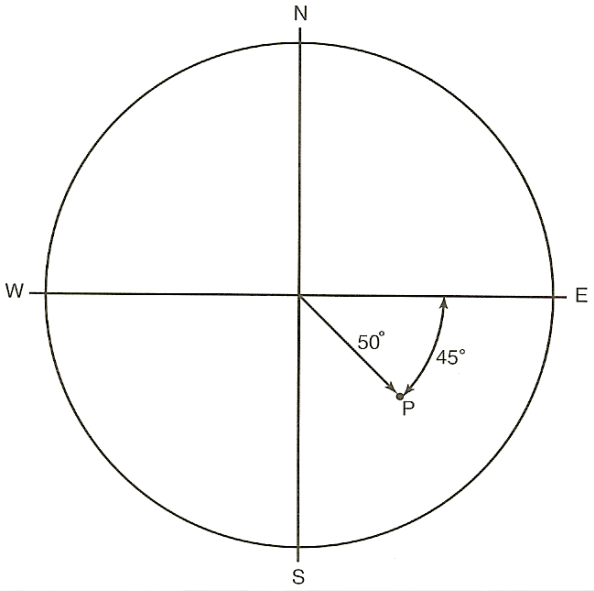
n = 180-dihedral angle f



Cullity page 71

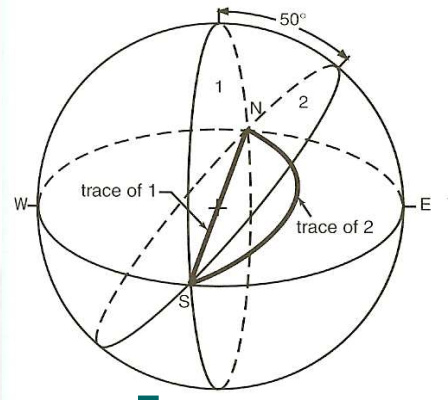
Stereographic projection

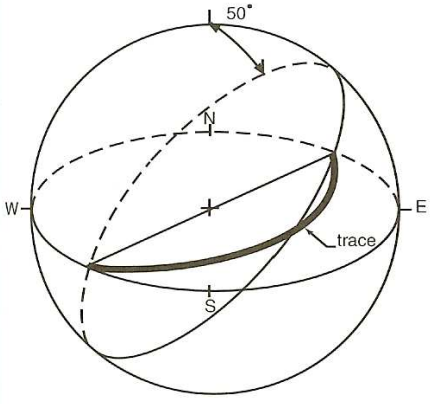




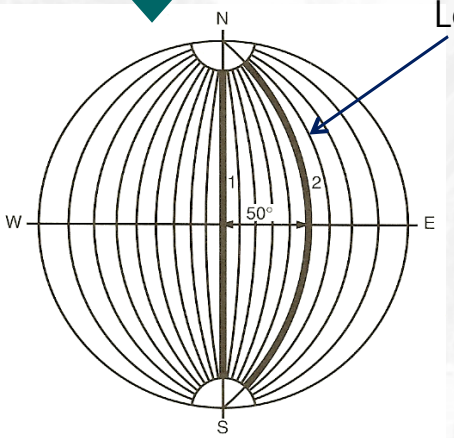
Krawitz page 49

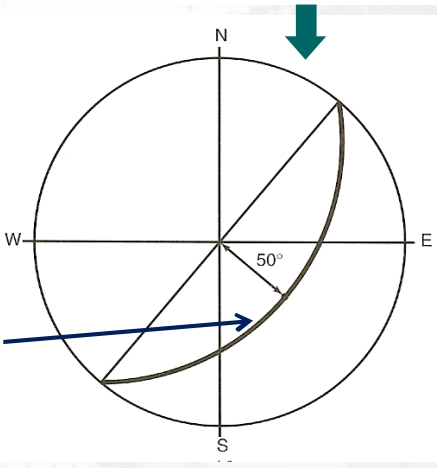
Stereographic projection





Great circles
Longitude lines

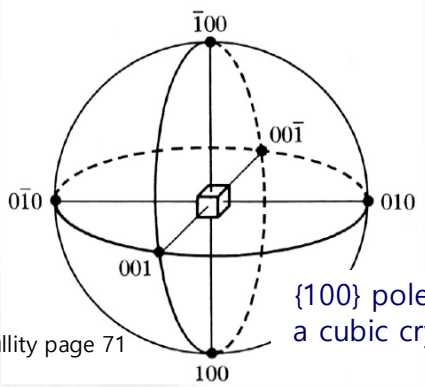




Great circles

Krawitz page 51

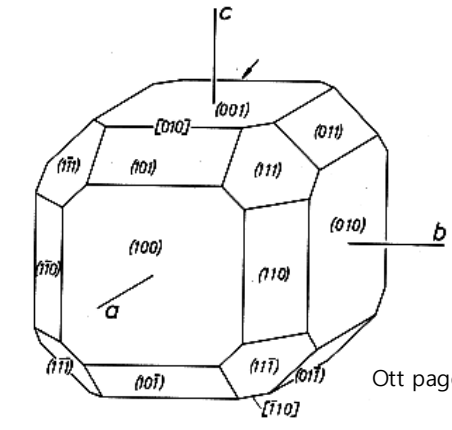
Stereographic projection



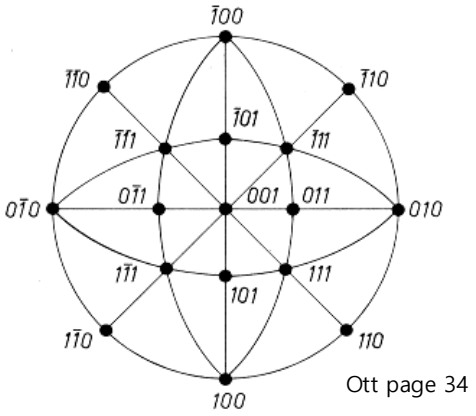
{100} poles of a cubic crystal

Cullity page 71

- Uses the inclination of the normal to the crystallographic plane.
- Points are the intersection of each crystal direction with a (unit radius) sphere.



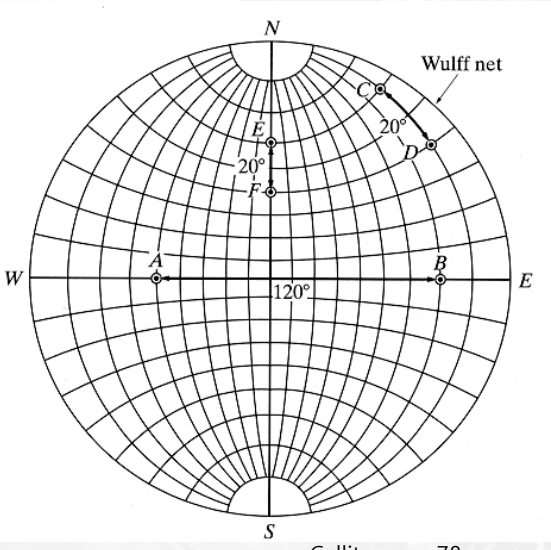
Ott page 27



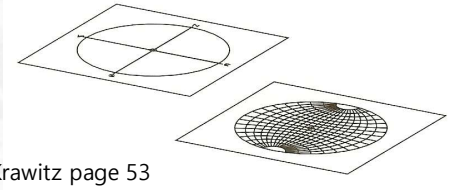
Ott page 34

Stereographic Projections

- "Only arcs of great circles are used when angles are plotted on or estimated from stereographic projections".
- Stereographic projection superimposed on Wulff net for measurement of angle between poles
- Direct measurement along great circle

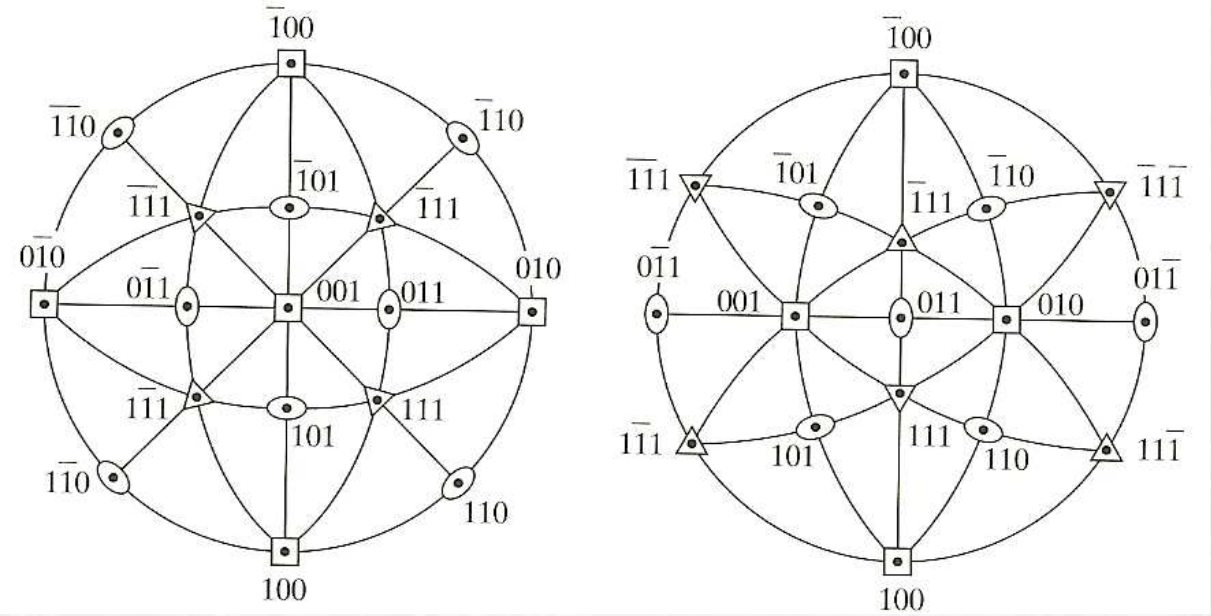


Cullity page 78



Krawitz page 53

Standard projections of cubic crystals



on (001) on (011)

Stereographic projection