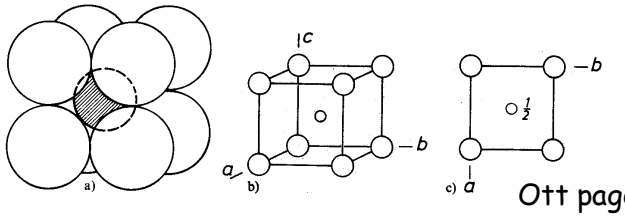
PROJECTION

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

three dimensional objects → flat surfaces

- parallel projection



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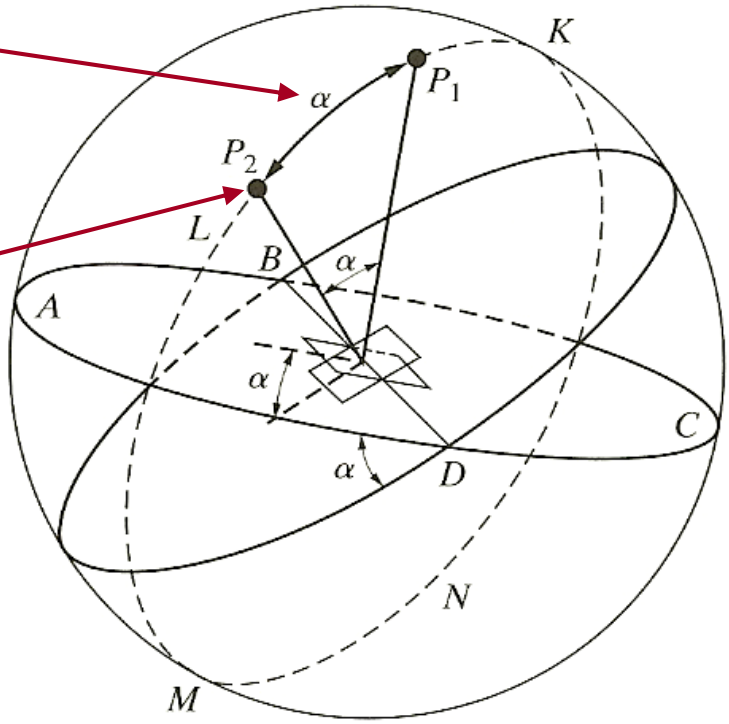
- **stereographic**- angular relationship between lattice planes and directions
- gnomonic
- orthographic

Angle between two planes

angle b/w the normals

pole



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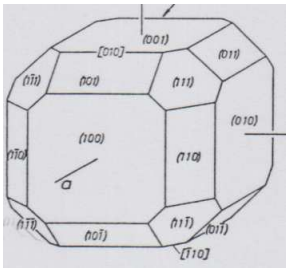
Stereographic projection

- 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



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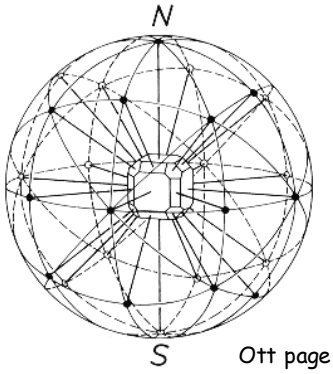

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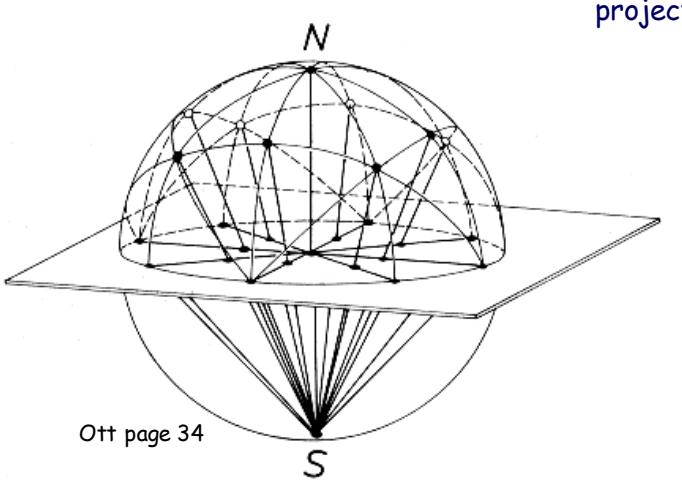
Stereographic Projections

- 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



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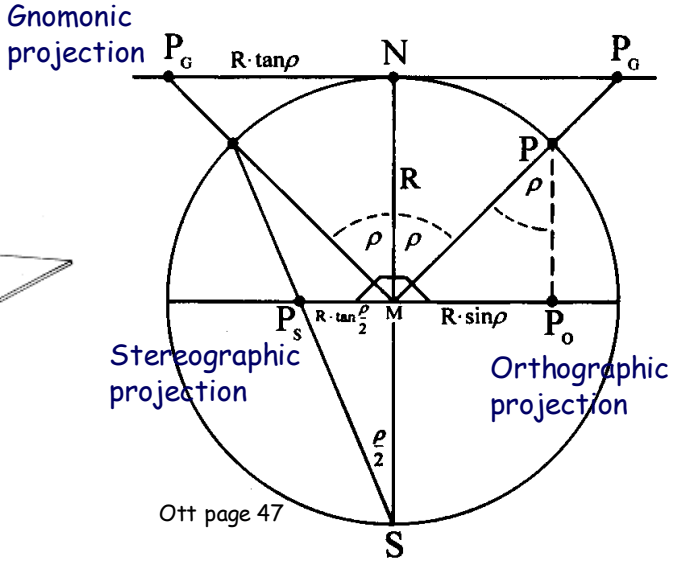

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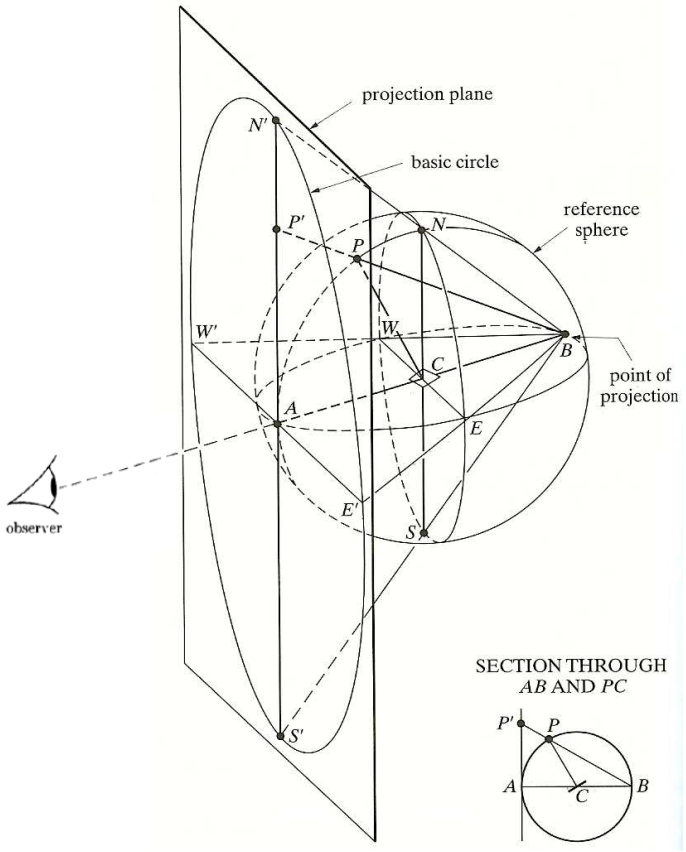
Projection from sphere to plane

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



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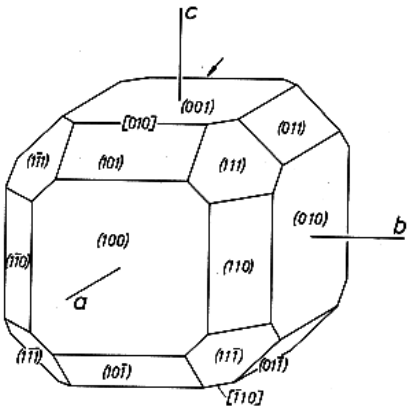
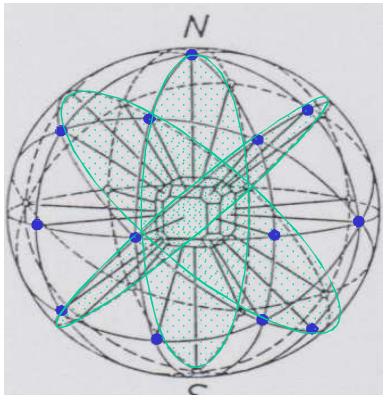
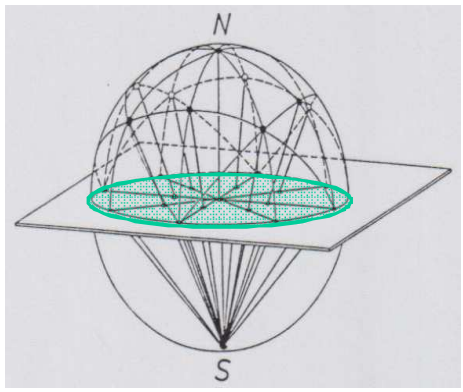
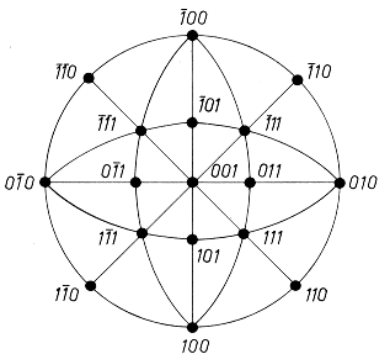
Stereographic projection

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









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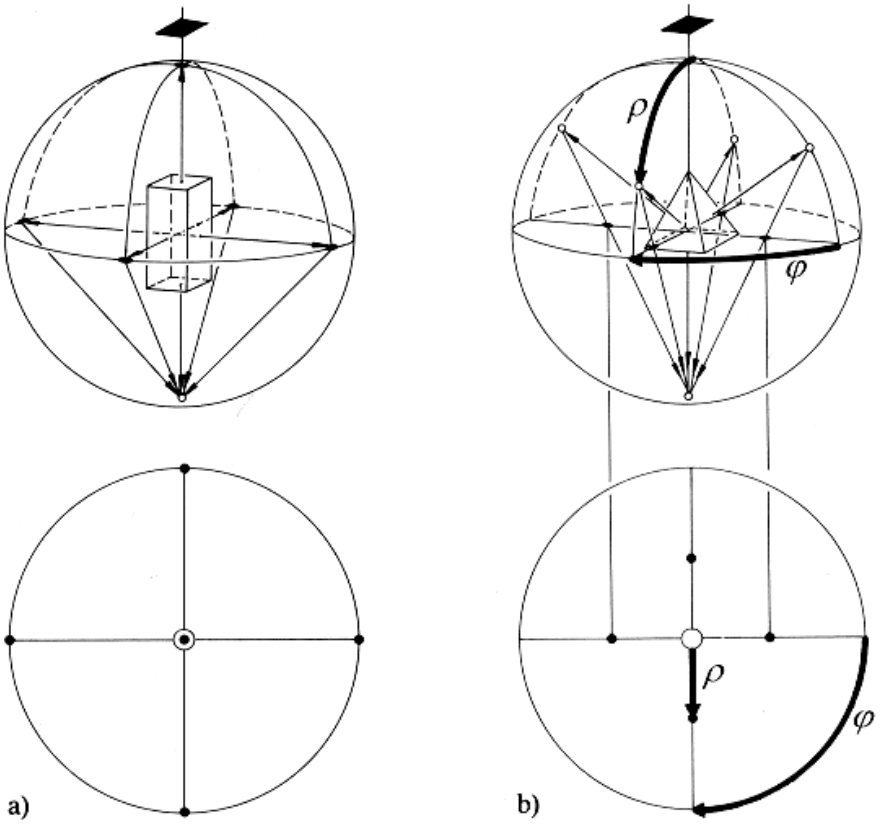
Stereographic Projections



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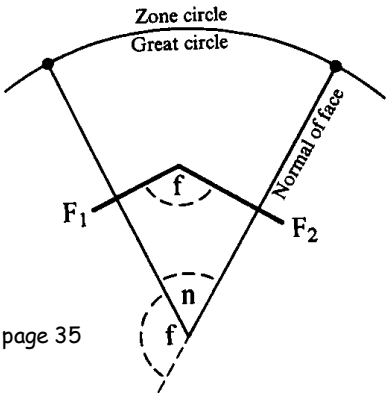
Stereographic Projections



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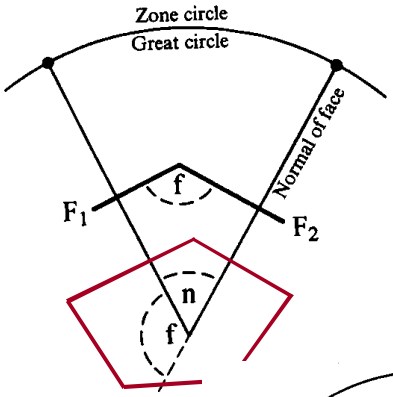
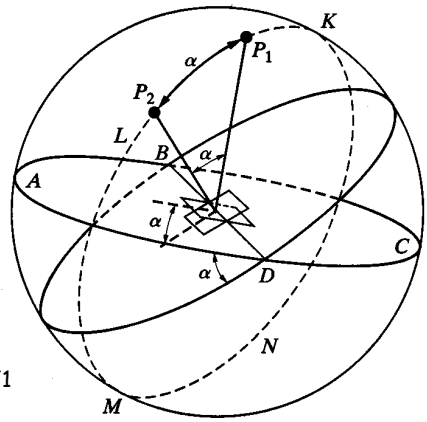


n = angle b/w poles = angle b/w normals

n = 180-dihedral angle f



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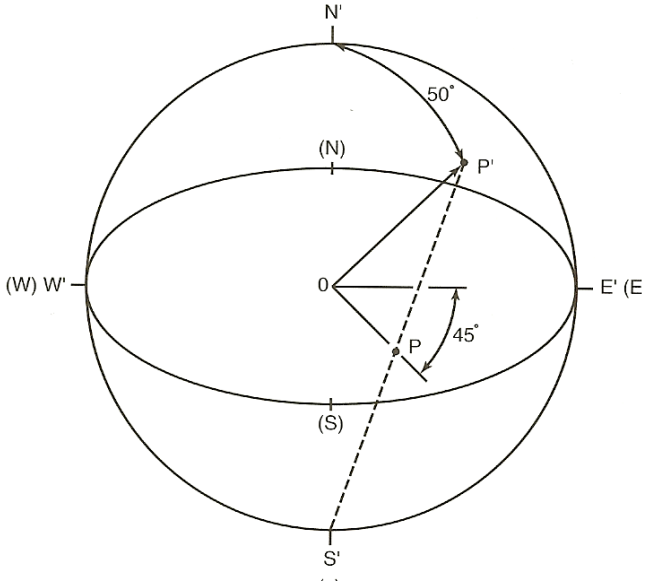
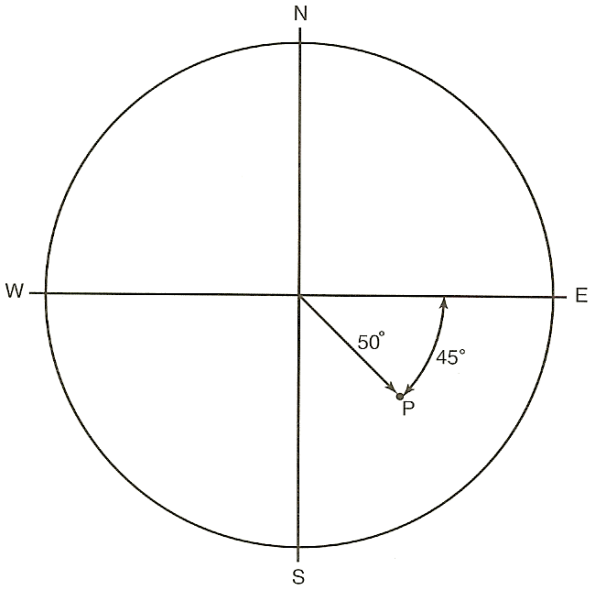
Stereographic projection





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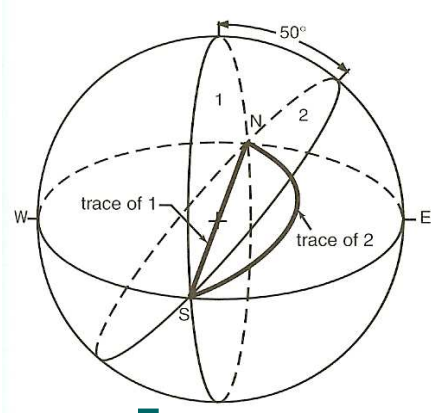
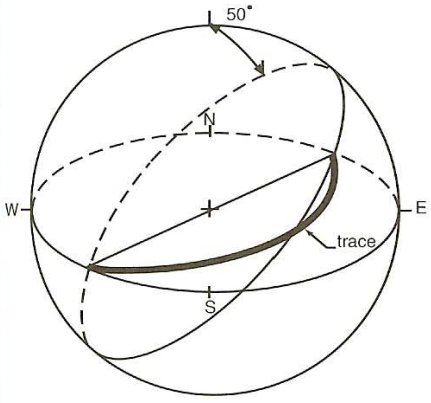
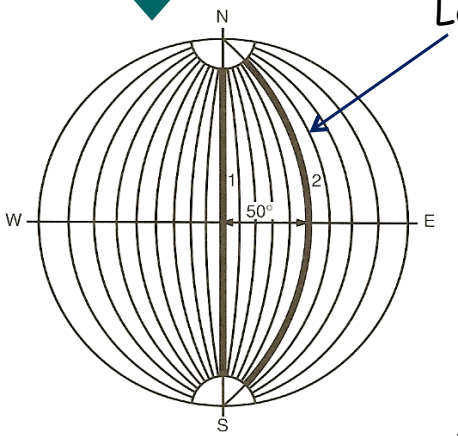
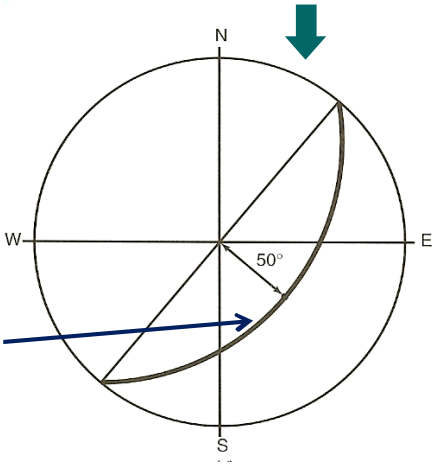
Stereographic projection





Great circles
Longitude lines





Great circles

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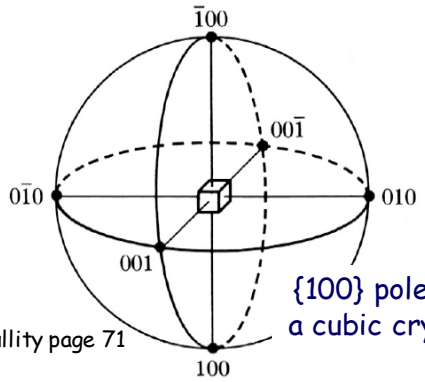
Stereographic projection



{100} poles of a cubic crystal

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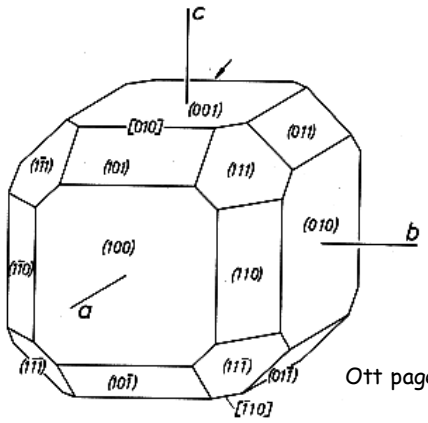
- Uses the inclination of the normal to the crystallographic plane
- Points are the intersection of each crystal direction with a (unit radius) sphere



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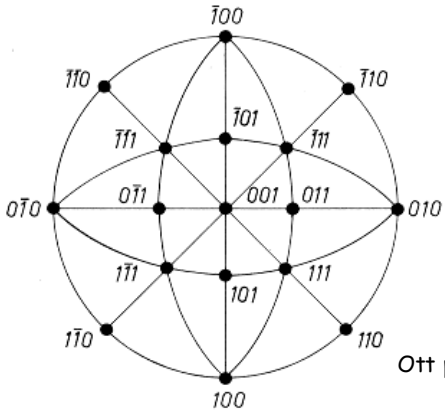

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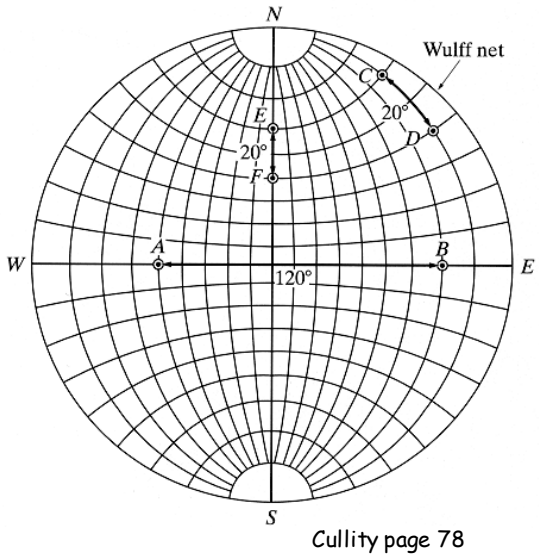
Stereographic Projections

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



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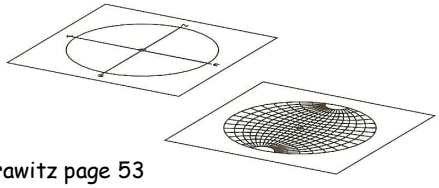

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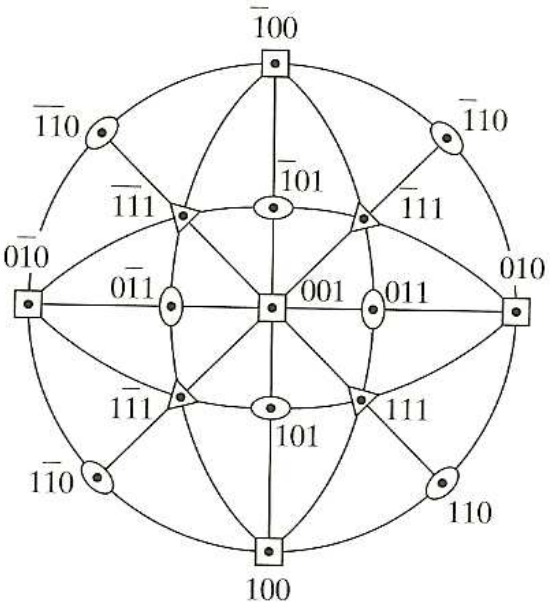
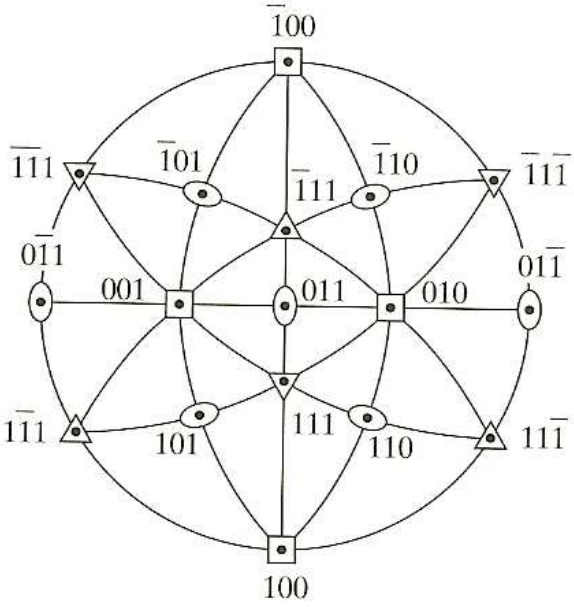
Standard projections of cubic crystals



on (001)



on (011)

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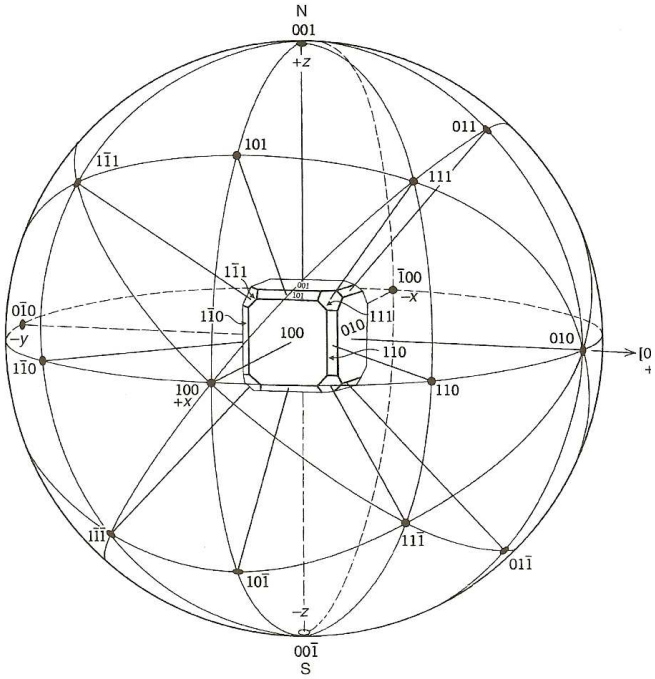
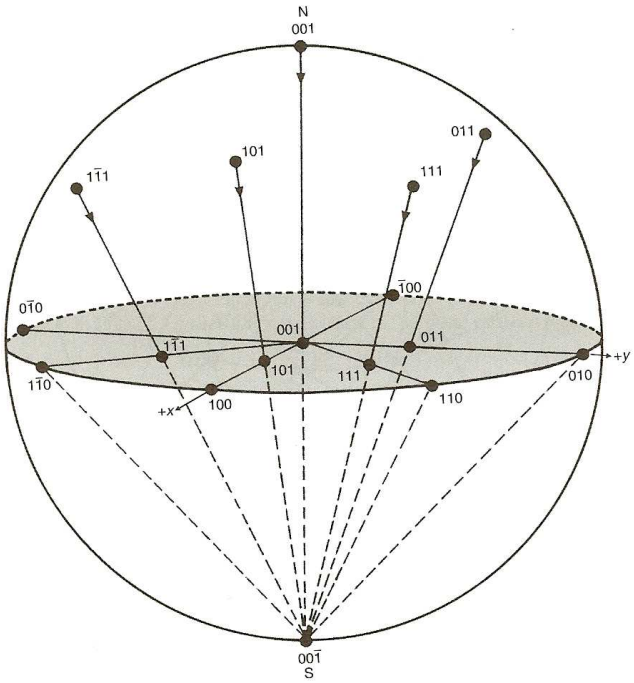
Stereographic projection





Hammond page 246, 247