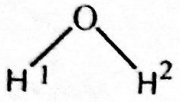
2. **PLANE OF SYMMETRY :**

Imaginary plane passing through the molecule which can bisect into two mirror image halves

H_2O : $C_2 + 2\sigma$:



Two planes

(1) σ bisecting O and reflecting H^1 and H^2.

(2) σ bisecting H^1–O–H^2.

AXIS :

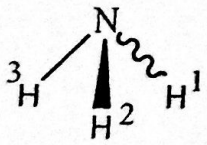
1 C_2 axis passing through O & interchange $\frac{H^1}{H^2}$:

NH_3:

$C_3 + 3\sigma$

NH_3 has 3 planes.

Plane :



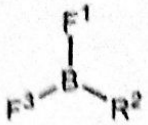
σ bisecting $N—H^1$ reflecting $\frac{H^2}{H^3}$

bisecting $N—H^2$ reflecting $\frac{H^1}{H^3}$

bisecting $N—H^3$ reflecting $\frac{H^1}{H^2}$

Axis :

C_3 axis passing through N atom along with three planes.

Plane : 

σ bisecting B—F^1 reflecting $\frac{F^2}{F^3}$

σ bisecting B—F^2 reflecting $\frac{F^1}{F^3}$

σ bisecting B—F^3 reflecting $\frac{F^1}{F^2}$

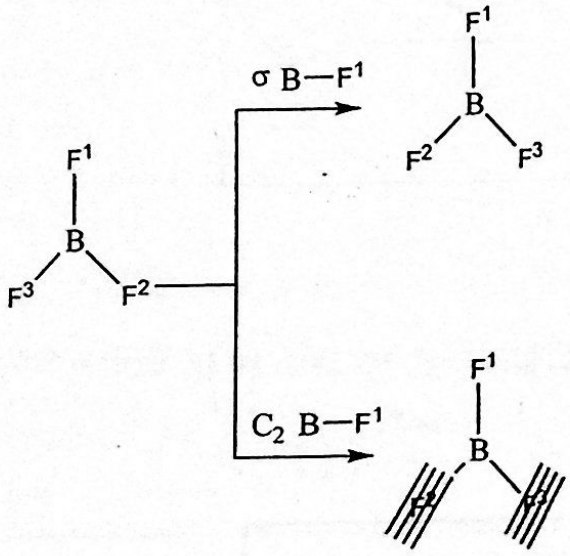
σ bisecting all 4 atoms.

Axis : C_1 passing through B—F^1 interchanging $\frac{F^2}{F^3}$

C_2 passing through B—F^2 interchanging $\frac{F^1}{F^3}$

C_3 passing through B—F^3 interchanging $\frac{F^1}{F^2}$

C_3 passing through B ⊥ to all C_2 axis or molecular plane.



BASIC DIFFERENCE BETWEEN C_2 AND σ PLANE: σ or plane does not change the face of reflecting atoms while C_2 changing the atoms along with its faces.