Symmetry Point Group Character Tables:

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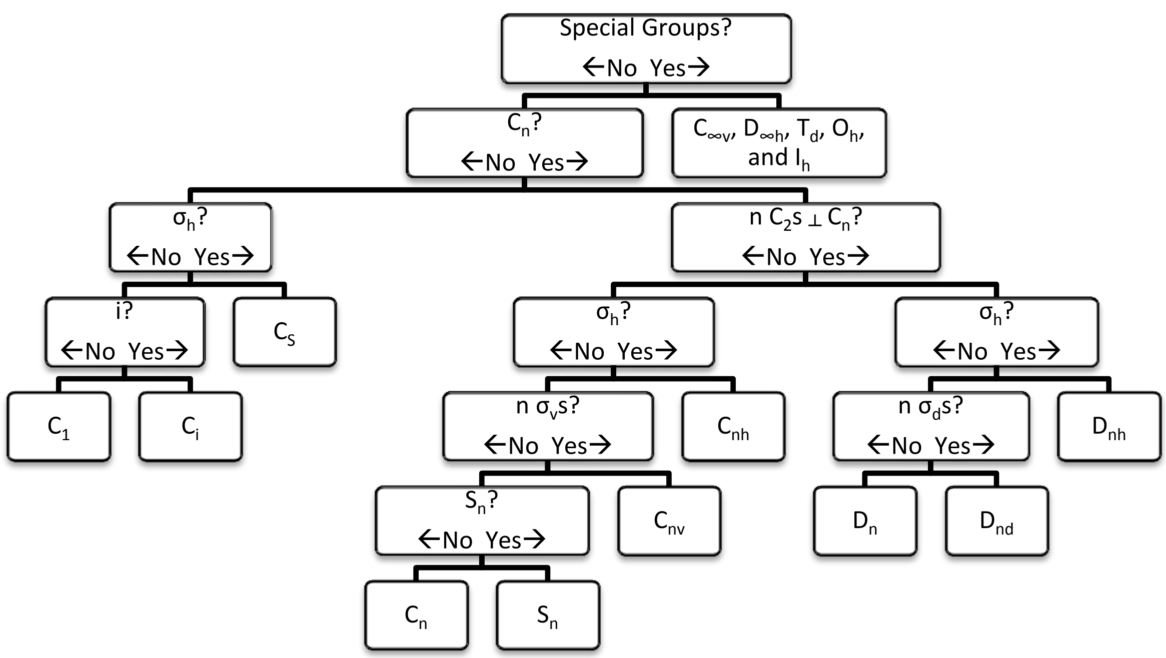
Point Group Identification Flow Chart:
Non-Axial: C_S, and C_i
C_n: C_2, C_3, C_4, C_5, and C_6
C_{nv}: C_{2v}, C_{3v}, C_{4v}, C_{5v}, and C_{6v}
C_{nh}: C_{2h}, C_{3h}, C_{4h}, C_{5h}, and C_{6h}
D_n: D_2, D_3, D_4, D_5, and D_6
D_{nh}: D_{2h}, D_{3h}, D_{4h}, D_{5h}, and D_{6h}
D_{nd}: D_{2d}, D_{3d}, D_{4d}, D_{5d}, and D_{6d}
S_n: S_4, S_6, S_8, and S_{10}
High Symmetry: T_d, O_h, and I_h
Linear: $C_{\infty v}$, and $D_{\infty h}$
Partial Correlation Tables for Linear Groups: $C_{\infty v} \rightarrow C_{2v}$, $D_{\infty h} \rightarrow D_{2h}$
Notes and Acknowledgements:

Point Group Identification Flow Chart



Non-Axial: C_S, and C_i

C_S – Abelian; h = 2 ; Subgroups = {Ø}

C_S	**E**	**σ_h**	**linear,**	**quadratic**

			rotations	
A'	1	1	x, y, R_z	x^2, y^2, z^2, xy
A''	1	-1	z, R_x, R_y	yz, xz

C_i – Abelian; h = 2 ; Subgroups = {Ø}

C_i	**E**	**i**	**linear, rotations**	**quadratic**
A_g	1	1	R_x, R_y, R_z	x^2, y^2, z^2, xy, xz, yz
A_u	1	-1	x, y, z	

C_n: C_2, C_3, C_4, C_5, and C_6

C_2 – Abelian; h = 2; Subgroups = {Ø}

C_2	**E**	**C_2**	**linear, rotations**	**quadratic**
A	1	1	z, R_z	x^2, y^2, z^2, xy
B	1	-1	x, y, R_x, R_y	yz, xz

C_3 – Abelian; h = 3; $\varepsilon = e^{2\pi i}/_3$; Subgroups = {Ø}

C_3	**E**	**C_3**	**$(C_3)^2$**	**linear, rotations**	**quadratic**
A	1	1	1	z, R_z	x^2+y^2, z^2
E	1 1	ε $ε^*$	$ε^*$ ε	(x,y), (R_x,R_y)	(x^2-y^2, xy), (yz, xz)

C_4 – Abelian; h = 4; Subgroups = {C_2}

C_4	**E**	**C_4**	**C_2**	**$(C_4)^3$**	**linear, rotations**	**quadratic**
A	1	1	1	1	z, R_z	x^2+y^2, z^2
B	1	-1	1	-1		x^2-y^2, xy
E	1 1	i -i	-1 -1	-i i	(x,y), (R_x,R_y)	(yz, xz)

C_5 – Abelian; h=5; $\varepsilon = e^{2\pi i}/_5$; Subgroups = {Ø}

C_5	**E**	**C_5**	**$(C_5)^2$**	**$(C_5)^3$**	**$(C_5)^4$**	**linear, rotations**	**quadratic**
A	1	1	1	1	1	z, R_z	x^2+y^2, z^2

E_1	1 1	ε ε^*	ε^2 ε^{2*}	ε^{2*} ε^2	ε^* ε	(x,y), (R_x,R_y)	(yz, xz)
E_2	1 1	ε^2 ε^{2*}	ε^* ε	ε ε^*	ε^{2*} ε^2		(x^2-y^2, xy)

C_6 – Abelian; h=6; $\varepsilon = e^{2\pi i/6}$; Subgroups = {$C_2$, C_3}

C_6	**E**	**C_6**	**C_3**	**C_2**	**$(C_3)^2$**	**$(C_6)^5$**	**linear, rotations**	**quadratic**
A	1	1	1	1	1	1	z, R_z	x^2+y^2, z^2
B	1	-1	1	-1	1	-1		
E_1	1 1	ε ε^*	$-\varepsilon^*$ $-\varepsilon$	-1 -1	$-\varepsilon$ $-\varepsilon^*$	ε^* ε	(x,y), (R_x,R_y)	(xz, yz)
E_2	1 1	$-\varepsilon^*$ $-\varepsilon$	$-\varepsilon$ $-\varepsilon^*$	1 1	$-\varepsilon^*$ $-\varepsilon$	$-\varepsilon$ $-\varepsilon^*$		(x^2-y^2, xy)

C_{nv}: C_{2v}, C_{3v}, C_{4v}, C_{5v}, and C_{6v}

C_{2v} – Abelian; h = 4; Subgroups = {C_S, C_2}

C_{2v}	**E**	**C_2 (z)**	**σ_v(xz)**	**σ_v(yz)**	**linear, rotations**	**quadratic**
A_1	1	1	1	1	z	x^2, y^2, z^2
A_2	1	1	-1	-1	R_z	xy
B_1	1	-1	1	-1	x, R_y	xz
B_2	1	-1	-1	1	y, R_x	yz

C_{3v} – Not Abelian; h = 6; Subgroups = {C_S, C_3}

C_{3v}	**E**	**$2C_3$ (z)**	**$3\sigma_v$**	**linear, rotations**	**quadratic**
A_1	1	1	1	z	x^2+y^2, z^2
A_2	1	1	-1	R_z	
E	2	-1	0	(x, y), (R_x, R_y)	(x^2-y^2, xy), (xz, yz)

C_{4v} – Not Abelian; h = 8; Subgroups = {C_S, C_2, C_4, C_{2v}}

C_{4v}	**E**	**$2C_4$ (z)**	**C_2**	**$2\sigma_v$**	**$2\sigma_d$**	**linear, rotations**	**quadratic**
A_1	1	1	1	1	1	z	x^2+y^2, z^2
A_2	1	1	1	-1	-1	R_z	

B_1	1	-1	1	1	-1		x^2-y^2
B_2	1	-1	1	-1	1		xy
E	2	0	-2	0	0	(x, y), (R_x, R_y)	(xz, yz)

C_{5v} – Not Abelian; h = 10; Subgroups = {C_S, C_5}

C_{5v}	**E**	**$2C_5$ (z)**	**$2(C_5)^2$**	**$5\sigma_v$**	**linear, rotations**	**quadratic**
A_1	1	1	1	1	z	x^2+y^2, z^2
A_2	1	1	1	-1	R_z	
E_1	2	$2\cos\left(\frac{2\pi}{5}\right)$	$2\cos\left(\frac{4\pi}{5}\right)$	0	(x, y), (R_x, R_y)	(xz, yz)
E_2	2	$2\cos\left(\frac{4\pi}{5}\right)$	$2\cos\left(\frac{2\pi}{5}\right)$	0		(x^2-y^2, xy)

C_{6v} – Not Abelian; h = 12; Subgroups = {C_S, C_2, C_3, C_6, C_{2v}, C_{3v}}

C_{6v}	**E**	**$2C_6$ (z)**	**$2C_3$ (z)**	**C_2 (z)**	**$3\sigma_v$**	**$3\sigma_d$**	**linear, rotations**	**quadratic**
A_1	1	1	1	1	1	1	z	x^2+y^2, z^2
A_2	1	1	1	1	-1	-1	R_z	
B_1	1	-1	1	-1	1	-1		
B_2	1	-1	1	-1	-1	1		
E_1	2	1	-1	-2	0	0	(x, y), (R_x, R_y)	(xz, yz)
E_2	2	-1	-1	2	0	0		(x^2-y^2, xy)

C_{nh}: C_{2h}, C_{3h}, C_{4h}, C_{5h}, and C_{6h}

C_{2h} – Abelian; h = 4; Subgroups = { C_S, C_i, C_2}

C_{2h}	**E**	**C_2 (z)**	**i**	**σ_h**	**linear, rotations**	**quadratic**
A_g	1	1	1	1	R_z	x^2, y^2, z^2, xy
B_g	1	-1	1	-1	R_x, R_y	xz, yz
A_u	1	1	-1	-1	z	
B_u	1	-1	-1	1	x, y	

C_{3h} – Abelian; h = 6; $\varepsilon = e^{2\pi i}/_3$; Subgroups = {$C_S$, C_3}

C_{3h}	**E**	**C_3(z)**	**$(C_3)^2$**	**σ_h**	**S_3**	**$(S_3)^5$**	**linear, rotations**	**quadratic functions**
A'	1	1	1	1	1	1	R_z	x^2+y^2, z^2

E'	1 1	ε ε^*	ε^* ε	1 1	ε ε^*	ε^* ε	(x, y)	(x^2-y^2, xy)
A''	1	1	1	-1	-1	-1	z	
E''	1 1	ε ε^*	ε^* ε	-1 -1	$-\varepsilon$ $-\varepsilon^*$	$-\varepsilon^*$ $-\varepsilon$	(R_x, R_y)	(xz, yz)

C_{4h} – Abelian; h = 8;   Subgroups = {C_S, C_i, C_2, C_4, C_{2h}, S_4}

C_{4h}	**E**	**C_4(z)**	**C_2**	**$(C_4)^3$**	**i**	**$(S_4)^3$**	**σ_h**	**S_4**	**linear, rotations**	**quadratic**
A_g	1	1	1	1	1	1	1	1	R_z	x^2+y^2, z^2
B_g	1	-1	1	-1	1	-1	1	-1		x^2-y^2, xy
E_g	1 1	i -i	-1 -1	-i i	1 1	i -i	-1 -1	-i i	(R_x, R_y)	(xz, yz)
A_u	1	1	1	1	-1	-1	-1	-1	z	
B_u	1	-1	1	-1	-1	1	-1	1		
E_u	1 1	i -i	-1 -1	-i i	-1 -1	-i i	1 1	i -i	(x, y)	

C_{5h} – Abelian; h = 10; $\varepsilon = e^{2\pi i/5}$;   Subgroups = {$C_S$, C_5}

C_{5h}	**E**	**C_5**	**$(C_5)^2$**	**$(C_5)^3$**	**$(C_5)^4$**	**σ_h**	**S_5**	**$(S_5)^7$**	**$(S_5)^3$**	**$(S_5)^9$**	**linear, rotations**	**quadratic**
A'	1	1	1	1	1	1	1	1	1	1	R_z	x^2+y^2, z^2
E'_1	1 1	ε ε^*	ε^2 ε^{2*}	ε^{2*} ε^2	ε^* ε	1 1	ε ε^*	ε^2 ε^{2*}	ε^{2*} ε^2	ε^* ε	(x, y)	
E'_2	1 1	ε^2 ε^{2*}	ε^* ε	ε ε^*	ε^{2*} ε^2	1 1	ε^2 ε^{2*}	ε^* ε	ε ε^*	ε^{2*} ε^2		(x^2-y^2, xy)
A''	1	1	1	1	1	-1	-1	-1	-1	-1	z	
E''_1	1 1	ε ε^*	ε^2 ε^{2*}	ε^{2*} ε^2	ε^* ε	-1 -1	$-\varepsilon$ $-\varepsilon^*$	$-\varepsilon^2$ $-\varepsilon^{2*}$	$-\varepsilon^{2*}$ $-\varepsilon^2$	$-\varepsilon^*$ $-\varepsilon$	(R_x, R_y)	(xz, yz)
E''_2	1 1	ε^2 ε^{2*}	ε^* ε	ε ε^*	ε^{2*} ε^2	-1 -1	$-\varepsilon^2$ $-\varepsilon^{2*}$	$-\varepsilon^*$ $-\varepsilon$	$-\varepsilon$ $-\varepsilon^*$	$-\varepsilon^{2*}$ $-\varepsilon^2$		

C_{6h} – Abelian; h = 12; $\varepsilon = e^{2\pi i/6}$;   Subgroups = {$C_S$, C_i, C_2, C_3, C_6, C_{2h}, C_{3h}, S_6}

C_{6h}	**E**	**C_6(z)**	**C_3**	**C_2**	**$(C_3)^2$**	**$(C_6)^5$**	**i**	**$(S_3)^5$**	**$(S_6)^5$**	**σ_h**	**S_6**	**S_3**	**linear, rotations**	**quadratic**
A_g	1	1	1	1	1	1	1	1	1	1	1	R_z	x^2+y^2, z^2	
B_g	1	-1	1	-1	1	-1	1	-1	1	-1	1	-1		

E_{1g}	1 1	ε ε^*	$-\varepsilon^*$ $-\varepsilon$	-1 -1	$-\varepsilon$ $-\varepsilon^*$	ε^* ε	1 1	ε ε^*	$-\varepsilon^*$ $-\varepsilon$	-1 -1	$-\varepsilon$ $-\varepsilon^*$	ε^* ε	(R_x, R_y)	(xz, yz)
E_{2g}	1 1	$-\varepsilon^*$ $-\varepsilon$	$-\varepsilon$ $-\varepsilon^*$	1 1	$-\varepsilon^*$ $-\varepsilon$	$-\varepsilon$ $-\varepsilon^*$	1 1	$-\varepsilon^*$ $-\varepsilon$	$-\varepsilon$ $-\varepsilon^*$	1 1	$-\varepsilon^*$ $-\varepsilon$	$-\varepsilon$ $-\varepsilon^*$		(x^2-y^2, xy)
A_u	1	1	1	1	1	1	-1	-1	-1	-1	-1	-1	Z	
B_u	1	-1	1	-1	1	-1	-1	1	-1	1	-1	1		
E_{1u}	1 1	ε ε^*	$-\varepsilon^*$ $-\varepsilon$	-1 -1	$-\varepsilon$ $-\varepsilon^*$	ε^* ε	-1 -1	$-\varepsilon$ $-\varepsilon^*$	ε^* ε	1 1	ε ε^*	$-\varepsilon^*$ $-\varepsilon$	(x, y)	
E_{2u}	1 1	$-\varepsilon^*$ $-\varepsilon$	$-\varepsilon$ $-\varepsilon^*$	1 1	$-\varepsilon^*$ $-\varepsilon$	$-\varepsilon$ $-\varepsilon^*$	-1 -1	ε^* ε	ε ε^*	-1 -1	ε^* ε	ε ε^*		

D_n: D_2, D_3, D_4, D_5, and D_6

D_2 – Abelian; h = 4; Subgroups = {C_2}

D_2	**E**	**C_2 (z)**	**C_2 (y)**	**C_2 (x)**	**linear, rotations**	**quadratic**
A	1	1	1	1		x^2, y^2, z^2
B_1	1	1	-1	-1	z, R_z	xy
B_2	1	-1	1	-1	y, R_y	xz
B_3	1	-1	-1	1	x, R_x	yz

D_3 – Not Abelian; h = 6; Subgroups = {C_2, C_3}

D_3	**E**	**$2C_3$ (z)**	**$3C'_2$**	**linear, rotations**	**quadratic**
A_1	1	1	1		x^2+y^2, z^2
A_2	1	1	-1	z, R_z	
E	2	-1	0	(x, y), (R_x, R_y)	(x^2-y^2, xy), (xz, yz)

D_4 – Not Abelian; h = 8; Subgroups = {C_2, C_4, D_2}

D_4	**E**	**$2C_4$ (z)**	**C_2 (z)**	**$2C'_2$**	**$2C''_2$**	**linear, rotations**	**quadratic**
A_1	1	1	1	1	1		x^2+y^2, z^2
A_2	1	1	1	-1	-1	z, R_z	
B_1	1	-1	1	1	-1		x^2-y^2
B_2	1	-1	1	-1	1		xy
E	2	0	-2	0	0	(x, y), (R_x, R_y)	(xz, yz)

D_5 – Not Abelian; h = 10; Subgroups = {C_2, C_5}

D_5	E	$2C_5$ (z)	$2(C_5)^2$	$5C'_2$	linear, rotations	quadratic
A_1	1	1	1	1		x^2+y^2, z^2
A_2	1	1	1	-1	z, R_z	
E_1	2	$2\cos\left(\frac{2\pi}{5}\right)$	$2\cos\left(\frac{4\pi}{5}\right)$	0	(x, y), (R_x, R_y)	(xz, yz)
E_2	2	$2\cos\left(\frac{4\pi}{5}\right)$	$2\cos\left(\frac{2\pi}{5}\right)$	0		

D_6 – Not Abelian; h = 12; Subgroups = {C_2, C_3, C_6, D_2, D_3}

D_6	E	$2C_6$ (z)	$2C_3$ (z)	C_2 (z)	$3C'_2$	$3C''_2$	linear, rotations	quadratic
A_1	1	1	1	1	1	1		x^2+y^2, z^2
A_2	1	1	1	1	-1	-1	z, R_z	
B_1	1	-1	1	-1	1	-1		
B_2	1	-1	1	-1	-1	1		
E_1	2	1	-1	-2	0	0	(x, y), (R_x, R_y)	(xz, yz)
E_2	2	-1	-1	2	0	0		(x^2-y^2, xy)

D_{nh}: D_{2h}, D_{3h}, D_{4h}, D_{5h}, and D_{6h}

D_{2h} – Abelian; h = 8; Subgroups = {C_S, C_i, C_2, C_{2v}, C_{2h}}

D_{2h}	E	C_2 (z)	C_2 (y)	C_2 (x)	i	σ (xy)	σ (xz)	σ (yz)	linear, rotations	quadratic
A_g	1	1	1	1	1	1	1	1		x^2, y^2, z^2
B_{1g}	1	1	-1	-1	1	1	-1	-1	R_z	xy
B_{2g}	1	-1	1	-1	1	-1	1	-1	R_y	xz
B_{3g}	1	-1	-1	1	1	-1	-1	1	R_x	yz
A_u	1	1	1	1	-1	-1	-1	-1		
B_{1u}	1	1	-1	-1	-1	-1	1	1	z	
B_{2u}	1	-1	1	-1	-1	1	-1	1	y	
B_{3u}	1	-1	-1	1	-1	1	1	-1	x	

D_{3h} – Not Abelian; h = 12; Subgroups = {C_S, C_2, C_3, C_{2v}, C_{3v}, C_{3h}, D_3}

D_{3h}	E	$2C_3$	$3C'_2$	σ_h	$2S_3$	$3\sigma_v$	linear, rotations	quadratic
A'_1	1	1	1	1	1	1		x^2+y^2, z^2

A'$_2$	1	1	-1	1	1	-1	R_z	
E'	2	-1	0	2	-1	0	(x, y)	(x^2-y^2, xy)
A''$_1$	1	1	1	-1	-1	-1		
A''$_2$	1	1	-1	-1	-1	1	z	
E''	2	-1	0	-2	1	0	(R_x, R_y)	(xz, yz)

D_{4h} – Not Abelian; h = 16; Subgroups = {C_S, C_i, C_2, C_4, C_{2v}, C_{4v}, C_{2h}, C_{4h}, D_2, D_4, D_{2h}, D_{2d}, S_4}

D$_{4h}$	**E**	**2C$_4$ (z)**	**C$_2$**	**2C'$_2$**	**2C''$_2$**	**i**	**2S$_4$**	**σ$_h$**	**2σ$_v$**	**2σ$_d$**	**linears, rotations**	**quadratic**
A$_{1g}$	1	1	1	1	1	1	1	1	1	1		x^2+y^2, z^2
A$_{2g}$	1	1	1	-1	-1	1	1	1	-1	-1	R_z	
B$_{1g}$	1	-1	1	1	-1	1	-1	1	1	-1		x^2-y^2
B$_{2g}$	1	-1	1	-1	1	1	-1	1	-1	1		xy
E$_g$	2	0	-2	0	0	2	0	-2	0	0	(R_x, R_y)	(xz, yz)
A$_{1u}$	1	1	1	1	1	-1	-1	-1	-1	-1		
A$_{2u}$	1	1	1	-1	-1	-1	-1	-1	1	1	z	
B$_{1u}$	1	-1	1	1	-1	-1	1	-1	-1	1		
B$_{2u}$	1	-1	1	-1	1	-1	1	-1	1	-1		
E$_u$	2	0	-2	0	0	-2	0	2	0	0	(x, y)	

D_{5h} – Abelian; h = 20; Subgroups = {C_S, C_2, C_5, C_{2v}, C_{5v}, C_{5h}, D_5}

D$_{5h}$	**E**	**2C$_5$**	**2(C$_5$)^2**	**5C'$_2$**	**h**	**2S$_5$**	**2(S$_5$)^3**	**5σ$_v$**	**linear, rotations**	**quadratic**
A'$_1$	1	1	1	1	1	1	1	1		x^2+y^2, z^2
A'$_2$	1	1	1	-1	1	1	1	-1	R_z	
E'$_1$	2	$2\cos\left(\frac{2\pi}{5}\right)$	$2\cos\left(\frac{4\pi}{5}\right)$	0	2	$2\cos\left(\frac{2\pi}{5}\right)$	$2\cos\left(\frac{4\pi}{5}\right)$	0	(x, y)	
E'$_2$	2	$2\cos\left(\frac{4\pi}{5}\right)$	$2\cos\left(\frac{2\pi}{5}\right)$	0	2	$2\cos\left(\frac{4\pi}{5}\right)$	$2\cos\left(\frac{2\pi}{5}\right)$	0		(x^2-y^2, xy)
A''$_1$	1	1	1	1	-1	-1	-1	-1		
A''$_2$	1	1	1	-1	-1	-1	-1	1	z	
E''$_1$	2	$2\cos\left(\frac{2\pi}{5}\right)$	$2\cos\left(\frac{4\pi}{5}\right)$	0	-2	$-2\cos\left(\frac{2\pi}{5}\right)$	$-2\cos\left(\frac{4\pi}{5}\right)$	0	(R_x, R_y)	(xz, yz)
E''$_2$	2	$2\cos\left(\frac{4\pi}{5}\right)$	$2\cos\left(\frac{2\pi}{5}\right)$	0	-2	$-2\cos\left(\frac{4\pi}{5}\right)$	$-2\cos\left(\frac{2\pi}{5}\right)$	0		

D_{6h} – Abelian; h = 24

Subgroups = { C_S, C_i, C_2, C_3, C_6, C_{2v}, C_{3v}, C_{6v}, C_{2h}, C_{3h}, C_{6h}, D_2, D_3, D_6, D_{2h}, D_{3h}, D_{3d}, S_6}

***D*$_{6h}$**	**E**	**2C$_6$**	**2C$_3$**	**C$_2$**	**3C'$_2$**	**3C''$_2$**	**i**	**2S$_3$**	**2S$_6$**	**σ_h**	**3σ_d**	**3σ_v**	**Linear, rotations**	**Quadratic**
A$_{1g}$	1	1	1	1	1	1	1	1	1	1	1	1		x^2+y^2, z^2
A$_{2g}$	1	1	1	1	-1	-1	1	1	1	1	-1	-1	R_z	
B$_{1g}$	1	-1	1	-1	1	-1	1	-1	1	-1	1	-1		
B$_{2g}$	1	-1	1	-1	-1	1	1	-1	1	-1	-1	1		
E$_{1g}$	2	1	-1	-2	0	0	2	1	-1	-2	0	0	(R_x, R_y)	(xz, yz)
E$_{2g}$	2	-1	-1	2	0	0	2	-1	-1	2	0	0		(x^2-y^2, xy)
A$_{1u}$	1	1	1	1	1	1	-1	-1	-1	-1	-1	-1		
A$_{2u}$	1	1	1	1	-1	-1	-1	-1	-1	-1	1	1	z	
B$_{1u}$	1	-1	1	-1	1	-1	-1	1	-1	1	-1	1		
B$_{2u}$	1	-1	1	-1	-1	1	-1	1	-1	1	1	-1		
E$_{1u}$	2	1	-1	-2	0	0	-2	-1	1	2	0	0	(x, y)	
E$_{2u}$	2	-1	-1	2	0	0	-2	1	1	-2	0	0		

D$_{nd}$: D_{2d}, D_{3d}, D_{4d}, D_{5d}, and D_{6d}

D_{2d} – Not Abelian; h = 8; Subgroups = {C_S, C_2, C_{2v}, D_2, S_4}

***D*$_{2d}$**	**E**	**2S$_4$**	**C$_2$ (z)**	**2C'$_2$**	**2σ_d**	**linear, rotations**	**quadratic**
A$_1$	1	1	1	1	1		x^2+y^2, z^2
A$_2$	1	1	1	-1	-1	R_z	
B$_1$	1	-1	1	1	-1		x^2-y^2
B$_2$	1	-1	1	-1	1	z	xy
E	2	0	-2	0	0	(x, y) (R_x, R_y)	(xz, yz)

D_{3d} – Not Abelian; h = 12; Subgroups = {C_S, C_i, C_2, C_3, C_{3v}, D_3, S_6}

***D*$_{3d}$**	**E**	**2C$_3$**	**3C'$_2$**	**i**	**2S$_6$**	**3σ_d**	**linear, rotations**	**quadratic**
A$_{1g}$	1	1	1	1	1	1		x^2+y^2, z^2
A$_{2g}$	1	1	-1	1	1	-1	R_z	
E$_g$	2	-1	0	2	-1	0	(R_x, R_y)	(x^2-y^2, xy) (xz, yz)
A$_{1u}$	1	1	1	-1	-1	-1		
A$_{2u}$	1	1	-1	-1	-1	1	z	
E$_u$	2	-1	0	-2	1	0	(x, y)	

D_{4d} – Not Abelian; h = 16; Subgroups = {C_S, C_2, C_4, C_{2v}, C_{4v}, D_2, D_4, S_8}

D_{4d}	E	$2S_8$	$2C_4$	$2(S_8)^3$	C_2	$4C'_2$	$4\sigma_d$	linear, rotations	quadratic
A_1	1	1	1	1	1	1	1		x^2+y^2, z^2
A_2	1	1	1	1	1	-1	-1	R_z	
B_1	1	-1	1	-1	1	1	-1		
B_2	1	-1	1	-1	1	-1	1	z	
E_1	2	$\sqrt{2}$	0	$-\sqrt{2}$	-2	0	0	(x, y)	
E_2	2	0	-2	0	2	0	0		(x^2-y^2, xy)
E_3	2	$-\sqrt{2}$	0	$\sqrt{2}$	-2	0	0	(R_x, R_y)	(xz, yz)

D_{5d} – Not Abelian; h = 20; Subgroups = {C_S, C_i, C_2, C_5, C_{5v}, D_5, S_{10}}

D_{5d}	E	$2C_5$	$2(C_5)^2$	$5C'_2$	i	$2(S_{10})^3$	$2S_{10}$	$5\sigma_d$	linear, rotations	quadratic
A_{1g}	1	1	1	1	1	1	1	1		x^2+y^2, z^2
A_{2g}	1	1	1	-1	1	1	1	-1	R_z	
E_{1g}	2	$2\cos\left(\frac{2\pi}{5}\right)$	$2\cos\left(\frac{4\pi}{5}\right)$	0	2	$2\cos\left(\frac{2\pi}{5}\right)$	$2\cos\left(\frac{4\pi}{5}\right)$	0	(R_x, R_y)	(xz, yz)
E_{2g}	2	$2\cos\left(\frac{4\pi}{5}\right)$	$2\cos\left(\frac{2\pi}{5}\right)$	0	2	$2\cos\left(\frac{4\pi}{5}\right)$	$2\cos\left(\frac{2\pi}{5}\right)$	0		(x^2-y^2, xy)
A_{1u}	1	1	1	1	-1	-1	-1	-1		
A_{2u}	1	1	1	-1	-1	-1	-1	1	z	
E_{1u}	2	$2\cos\left(\frac{2\pi}{5}\right)$	$2\cos\left(\frac{4\pi}{5}\right)$	0	-2	$-2\cos\left(\frac{2\pi}{5}\right)$	$-2\cos\left(\frac{4\pi}{5}\right)$	0	(x, y)	
E_{2u}	2	$2\cos\left(\frac{4\pi}{5}\right)$	$2\cos\left(\frac{2\pi}{5}\right)$	0	-2	$-2\cos\left(\frac{4\pi}{5}\right)$	$-2\cos\left(\frac{2\pi}{5}\right)$	0		

D_{6d} – Not Abelian; h = 24; Subgroups = {C_S, C_2, C_3, C_6, C_{2v}, C_{3v}, C_{6v}, D_2, D_3, D_6, S_4, S_{12}}

D_{6d}	E	$2S_{12}$	$2C_6$	$2S_4$	$2C_3$	$2(S_{12})^5$	C_2	$6C'_2$	$6\sigma_d$	linear, rotations	quadratic
A_1	1	1	1	1	1	1	1	1	1		x^2+y^2, z^2
A_2	1	1	1	1	1	1	1	-1	-1	R_z	
B_1	1	-1	1	-1	1	-1	1	1	-1		
B_2	1	-1	1	-1	1	-1	1	-1	1	z	
E_1	2	$\sqrt{3}$	1	0	-1	$-\sqrt{3}$	-2	0	0	(x, y)	
E_2	2	1	-1	-2	-1	1	2	0	0		(x^2-y^2, xy)

E_3	2	0	-2	0	2	0	-2	0	0		
E_4	2	-1	-1	2	-1	-1	2	0	0		
E_5	2	$-\sqrt{3}$	1	0	-1	$\sqrt{3}$	-2	0	0	(R_x, R_y)	(xz, yz)

S_n: S_4, S_6, S_8, and S_{10}

S_4 – Abelian; h = 4; Subgroups = {C_2}

S_4	**E**	**S_4**	**C_2**	**$(S_4)^3$**	**linear, rotations**	**quadratic**
A	1	1	1	1	R_z	x^2+y^2, z^2
B	1	-1	1	-1	z	x^2-y^2, xy
E	1 1	i -i	-1 -1	-i i	(x, y), (R_x, R_y)	(xz, yz)

S_6 – Abelian; h = 6; $\varepsilon = e^{2\pi i/6}$; Subgroups = {$C_i$, C_3}

S_6	**E**	**C_3(z)**	**$(C_3)^2$**	**i**	**$(S_6)^5$**	**S_6**	**linear, rotations**	**quadratic**
A_g	1	1	1	1	1	1	R_z	x^2+y^2, z^2
E_g	1 1	ε ε^*	ε^* ε	1 1	ε ε^*	ε^* ε	(R_x, R_y)	$(x^2-y^2$, xy) (xz, yz)
A_u	1	1	1	-1	-1	-1	Z	
E_u	1 1	ε ε^*	ε^* ε	-1 -1	ε ε^*	ε^* ε	(x, y)	

S_8 – Abelian; h = 8; $\varepsilon = e^{2\pi i/8}$; Subgroups = {$C_2$, C_4}

S_8	**E**	**S_8**	**C_4 (z)**	**$(S_8)^3$**	**C_2**	**$(S_8)^5$**	**$(C_4)^3$**	**$(S_8)^7$**	**linear, rotations**	**quadratic**
A	1	1	1	1	1	1	1	1	R_z	x^2+y^2, z^2
B	1	-1	1	-1	1	-1	1	-1	z	
E_1	1 1	ε ε^*	i -i	$-\varepsilon^*$ $-\varepsilon$	-1 -1	$-\varepsilon$ $-\varepsilon^*$	-i i	ε^* ε	(x, y)	
E_2	1 1	i -i	-1 -1	-i i	1 1	i -i	-1 -1	-i i		$(x^2-y^2$, xy)
E_3	1 1	$-\varepsilon$ $-\varepsilon^*$	i -i	ε^* ε	-1 -1	ε ε^*	-i i	$-\varepsilon^*$ $-\varepsilon$	(R_x, R_y)	(xz, yz)

S_{10} – Abelian; h = 10; $\varepsilon = e^{2\pi i/10}$; Subgroups = {$C_i$, C_5}

S_{10}	E	C_5	$(C_5)^2$	$(C_5)^3$	$(C_5)^4$	i	$(S_{10})^7$	$(S_{10})^9$	S_{10}	$(S_{10})^3$	linear, rotations	quadratic
A_g	1	1	1	1	1	1	1	1	1	1	R_z	z^2, x^2+y^2
E_{1g}	1 1	ε ε^*	ε^2 ε^{2*}	ε^{2*} ε^2	ε^* ε	+1 1	$+\varepsilon$ ε^*	$+\varepsilon^2$ ε^{2*}	$+\varepsilon^{2*}$ ε^2	$+\varepsilon^*$ $\varepsilon+$	(R_x,R_y)	(xz, yz)
E_{2g}	1 1	ε^2 ε^{2*}	ε^* ε	ε ε^*	ε^{2*} ε^2	1 1	$+\varepsilon^2$ ε^{2*}	$+\varepsilon^*$ $\varepsilon+$	$+\varepsilon$ ε^*	$+\varepsilon^{2*}$ ε^2		(x^2-y^2, xy)
A_u	1	1	1	1	1	-1	-1	-1	-1	-1	Z	
E_{1u}	1 1	ε ε^*	ε^2 ε^{2*}	ε^{2*} ε^2	ε^* ε	-1 -1	$-\varepsilon$ $-\varepsilon^*$	$-\varepsilon^2$ $-\varepsilon^{2*}$	$-\varepsilon^{2*}$ $-\varepsilon^2$	$-\varepsilon^*$ $\varepsilon-$	(x, y)	
E_{2u}	1 1	ε^2 ε^{2*}	ε^* ε	ε ε^*	ε^{2*} ε^2	-1 -1	$-\varepsilon^2$ $-\varepsilon^{2*}$	$-\varepsilon^*$ $-\varepsilon$	$-\varepsilon$ $-\varepsilon^*$	$-\varepsilon^{2*}$ $-\varepsilon^2$		

High Symmetry: T_d, O_h, and I_h

T_d – Abelian; h = 24; Subgroups = {Many}

T_d	E	$8C_3$	$3C_2$	$6S_4$	$6\sigma_d$	linear, rotations	quadratic
A_1	1	1	1	1	1		$x^2+y^2+z^2$
A_2	1	1	1	-1	-1		
E	2	-1	2	0	0		$(2z^2-x^2-y^2, x^2-y^2)$
T_1	3	0	-1	1	-1	(R_x, R_y, R_z)	
T_2	3	0	-1	-1	1	(x, y, z)	(xy, xz, yz)

O_h – Not Abelian; h = 48; Subgroups = {Many}

O_h	E	$8C_3$	$6C_2$	$6C_4$	$3C_2 =(C_4)^2$	i	$6S_4$	$8S_6$	$3\sigma_h$	$6\sigma_d$	linear, rotations	quadratic
A_{1g}	1	1	1	1	1	1	1	1	1	1		$x^2+y^2+z^2$
A_{2g}	1	1	-1	-1	1	1	-1	1	1	-1		
E_g	2	-1	0	0	2	2	0	-1	2	0		$(2z^2-x^2-y^2, x^2-y^2)$
T_{1g}	3	0	-1	1	-1	3	1	0	-1	-1	(R_x, R_y, R_z)	
T_{2g}	3	0	1	-1	-1	3	-1	0	-1	1		(xz, yz, xy)
A_{1u}	1	1	1	1	1	-1	-1	-1	-1	-1		
A_{2u}	1	1	-1	-1	1	-1	1	-1	-1	1		
E_u	2	-1	0	0	2	-2	0	1	-2	0		
T_{1u}	3	0	-1	1	-1	-3	-1	0	1	1	(x, y, z)	
T_{2u}	3	0	1	-1	-1	-3	1	0	1	-1		

I_h – Not Abelian; h = 120; Subgroups = {Many}

I_h	E	$12C_5$	$12(C_5)^2$	$20C_3$	$15C_2$	i	$12S_{10}$	$12(S_{10})^3$	$20S_6$	15σ	linear, rotations	quadratic
A_g	1	1	1	1	1	1	1	1	1	1		$x^2+y^2+z^2$
T_{1g}	3	$-2\cos\left(\frac{4\pi}{5}\right)$	$-2\cos\left(\frac{2\pi}{5}\right)$	0	-1	3	$-2\cos\left(\frac{2\pi}{5}\right)$	$-2\cos\left(\frac{4\pi}{5}\right)$	0	-1	(R_x, R_y, R_z)	
T_{2g}	3	$-2\cos\left(\frac{2\pi}{5}\right)$	$-2\cos\left(\frac{4\pi}{5}\right)$	0	-1	3	$-2\cos\left(\frac{4\pi}{5}\right)$	$-2\cos\left(\frac{2\pi}{5}\right)$	0	-1		
G_g	4	-1	-1	1	0	4	-1	-1	1	0		
H_g	5	0	0	-1	1	5	0	0	-1	1		$(2z^2-x^2-y^2, x^2-y^2, xy, xz, yz)$
A_u	1	1	1	1	1	-1	-1	-1	-1	-1		
T_{1u}	3	$-2\cos\left(\frac{4\pi}{5}\right)$	$-2\cos\left(\frac{2\pi}{5}\right)$	0	-1	-3	$2\cos\left(\frac{2\pi}{5}\right)$	$2\cos\left(\frac{4\pi}{5}\right)$	0	1	(x, y, z)	
T_{2u}	3	$-2\cos\left(\frac{2\pi}{5}\right)$	$-2\cos\left(\frac{4\pi}{5}\right)$	0	-1	-3	$2\cos\left(\frac{4\pi}{5}\right)$	$2\cos\left(\frac{2\pi}{5}\right)$	0	1		
G_u	4	-1	-1	1	0	-4	1	1	-1	0		
H_u	5	0	0	-1	1	-5	0	0	1	-1		

Linear: $C_{\infty v}$, and $D_{\infty h}$

$C_{\infty v}$ – Not Abelian; h = ∞; Subgroups = {Many}

$C_{\infty v}$	E	$2C_\infty$	...	$\infty\ \sigma_v$	linear, rotations	quadratic
$A_1=\Sigma^+$	1	1	...	1	z	x^2+y^2, z^2
$A_2=\Sigma^-$	1	1	...	-1	R_z	
$E_1=\Pi$	2	$2\cos(\varphi)$	...	0	$(x, y), (R_x, R_y)$	(xz, yz)
$E_2=\Delta$	2	$2\cos(2\varphi)$	...	0		(x^2-y^2, xy)
$E_3=\Phi$	2	$2\cos(3\varphi)$	...	0		
...	...	...	...	...		

$D_{\infty h}$ – Not Abelian; h = ∞; Subgroups = {Many}

$D_{\infty h}$	E	$2C_\infty$	...	$\infty\sigma_v$	i	$2S_\infty$	...	$\infty C'_2$	linear functions, rotations	quadratic
$A_{1g}=\Sigma^+_g$	1	1	...	1	1	1	...	1		x^2+y^2, z^2
$A_{2g}=\Sigma^-_g$	1	1	...	-1	1	1	...	-1	R_z	
$E_{1g}=\Pi_g$	2	$2\cos(\varphi)$	...	0	2	$-2\cos(\varphi)$	...	0	(R_x, R_y)	(xz, yz)

$E_{2g}=\Delta_g$	2	$2\cos(2\varphi)$	…	0	2	$2\cos(2\varphi)$	…	0		(x^2-y^2, xy)
$E_{3g}=\Phi_g$	2	$2\cos(3\varphi)$	…	0	2	$-2\cos(3\varphi)$	…	0		
…	…	…	…	…	…	…	…	…		
$A_{1u}=\Sigma^+_u$	1	1	…	1	-1	-1	…	-1	z	
$A_{2u}=\Sigma^-_u$	1	1	…	-1	-1	-1	…	1		
$E_{1u}=\Pi_u$	2	$2\cos(\varphi)$	…	0	-2	$2\cos(\varphi)$	…	0	(x, y)	
$E_{2u}=\Delta_u$	2	$2\cos(2\varphi)$	…	0	-2	$-2\cos(2\varphi)$	…	0		
$E_{3u}=\Phi_u$	2	$2\cos(3\varphi)$	…	0	-2	$2\cos(3\varphi)$	…	0		
…	…	…	…	…	…	…	…	…		

Partial Correlation Tables for Linear Groups: $C_{\infty v} \rightarrow C_{2v}$, $D_{\infty h} \rightarrow D_{2h}$

$C_{\infty v} \rightarrow C_{2v}$

$C_{\infty v}$	**C_{2v}**
$A_1=\Sigma^+$	A_1
$A_2=\Sigma^-$	A_2
$E_1=\Pi$	$B_1 + B_2$
$E_2=\Delta$	$A_1 + A_2$

$D_{\infty h} \rightarrow D_{2h}$

$D_{\infty h}$	**D_{2h}**
$A_{1g}=\Sigma^+_g$	A_g
$A_{2g}=\Sigma^-_g$	B_{1g}
$E_{1g}=\Pi_g$	$B_{2g} + B_{3g}$
$E_{2g}=\Delta_g$	$A_g + B_{1g}$
…	
$A_{1u}=\Sigma^+_u$	B_{1u}
$A_{2u}=\Sigma^-_u$	A_u
$E_{1u}=\Pi_u$	$B_{2u} + B_{3u}$
$E_{2u}=\Delta_u$	$A_u + B_{1u}$
…	

Notes and Acknowledgements:

1. Linear functions x, y, and z can represent translational degrees of freedom. Linear functions R_x, R_y, and R_z can represent rotational degrees of freedom.

2. Vibrational modes which share a symmetry species with one of the three linear functions x, y, or z will be infrared active. Vibrational modes which share a symmetry species with one of the quadratic functions will be Raman active.
3. Degenerate functions (x ± iy) and ($R_x \pm iR_y$) are represented as simply (x, y) and (R_x, R_y).
4. While I have worked hard to ensure that this document is correct, I assume no responsibility for the accuracy of the information here.

This document was compiled with the help of these references:

1. http://www.webqc.org/symmetry.php
2. http://en.wikipedia.org/wiki/List_of_character_tables_for_chemically_important_3D_point_groups
3. Carter, Robert L. *Molecular Symmetry and Group Theory*. John Wiley and Sons, Inc. (Hoboken, NJ) 1998.