

Descent in symmetry and subgroups

The following tables show the correlation between the irreducible representations of a group and those of some of its subgroups. In a number of cases more than one correlation exists between groups. In C_s the σ of the heading indicates which of the planes in the parent group becomes the sole plane of C_s ; in C_{2v} it becomes must be set by a convention); where there are various possibilities for the correlation of C_2 axes and σ planes in D_{4h} and D_{6h} with their subgroups, the column is headed by the symmetry operation of the parent group that is preserved in the descent.

C_{2v}	C_2	C_s $\sigma(zx)$	C_s $\sigma(yz)$
A_1	A	A'	A'
A_2	A	A''	A''
B_1	B	A'	A'
B_2	B	A''	A''

C_{3v}	C_3	C_s
A_1	A	A'
A_2	A	A''
E	E	$A' + A''$

C_{4v}	C_{2v} σ_v	C_{2v} σ_d
A_1	A_1	A_1
A_2	A_2	A_2
B_1	A_1	A_2
B_2	A_2	A_1
E	$B_1 + B_2$	$B_1 + B_2$

[Other subgroups: C_4 , C_2 , C_6]

D_{3h}	C_{3h}	C_{3v}	C_{2v} $\sigma_h \rightarrow \sigma_v$	C_s σ_h	C_s σ_v
A'_1	A'	A_1	A_1	A'	A'
A'_2	A'	A_2	B_2	A'	A''
E'	E'	E	$A_1 + B_2$	$2A'$	$A' + A''$
A''_1	A''	A_2	A_2	A''	A''
A''_2	A''	A_1	B_1	A''	A'
E''	E''	E	$A_2 + B_1$	$2A''$	$A' + A''$

[Other subgroups: D_3 , C_3 , C_2]

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D_{4h}	D_{2d} $C_2' (\rightarrow C_2')$	D_{2d} $C_2'' (\rightarrow C_2'')$	D_{2h} C_2'	D_{2h} C_2''	D_2 C_2'	D_2 C_2''	C_{4h}	C_{4v}	C_{2v} C_2, σ_v	C_{2v} C_2, σ_d
A_{1g}	A_1	A_1	A_g	A_g	A	A	A_g	A_1	A_1	A_1
A_{2g}	A_2	A_2	B_{1g}	B_{1g}	B_1	B_1	A_g	A_2	A_2	A_2
B_{1g}	B_1	B_2	A_g	B_{1g}	A	B_1	B_g	B_1	A_1	A_2
B_{2g}	B_2	B_1	B_{1g}	A_g	B_1	A	B_g	B_2	A_2	A_1
E_g	E	E	$B_{2g} + B_{3g}$	$B_{2g} + B_{3g}$	$B_2 + B_3$	$B_2 + B_3$	E_g	E	$B_1 + B_2$	$B_1 + B_2$
A_{1u}	B_1	B_1	A_u	A_u	A	A	A_u	A_2	A_2	A_2
A_{2u}	B_2	B_2	B_{1u}	B_{1u}	B_1	B_1	A_u	A_1	A_1	A_1
B_{1u}	A_1	A_2	A_u	B_{1u}	A	B_1	B_u	B_2	A_2	A_1
B_{2u}	A_2	A_1	B_{1u}	A_u	B_1	A	B_u	B_1	A_1	A_2
E_u	E	E	$B_{2u} + B_{3u}$	$B_{2u} + B_{3u}$	$B_2 + B_3$	$B_2 + B_3$	E_u	E	$B_1 + B_2$	$B_1 + B_2$

Other subgroups: $D_4, C_4, S_4, 3C_{2h}, 3C_s, 3C_2, C_i, (2C_{2v})$

D_6	$D_{3d}C_2''$	$D_{3d}C_2'$	D_{2h} $\sigma_h \rightarrow \sigma(xy)$ $\sigma_v \rightarrow \sigma(yz)$	C_{6v}	C_{3v} σ_v	C_{2v} C_2'	C_{2v} C_2''	C_{2h} C_2	C_{2h} C_2'	C_{2h} C_2''
A_{1g}	A_{1g}	A_{1g}	A_g	A_1	A_1	A_1	A_1	A_g	A_g	A_g
A_{2g}	A_{2g}	A_{2g}	B_{1g}	A_2	A_2	B_1	B_1	A_g	B_g	B_g
B_{1g}	A_{2g}	A_{1g}	B_{2g}	B_2	A_2	A_2	B_2	B_g	A_g	B_g
B_{2g}	A_{1g}	A_{2g}	B_{3g}	B_1	A_1	B_2	A_2	B_g	B_g	A_g
E_{1g}	E_g	E_g	$B_{2g} + B_{3g}$	E_1	E	$A_2 + B_2$	$A_2 + B_2$	$2B_g$	$A_g + B_g$	$A_g + B_g$
E_{2g}	E_g	E_g	$A_g + B_{1g}$	E_2	E	$A_1 + B_1$	$A_1 + B_1$	$2A_g$	$A_g + B_g$	$A_g + B_g$
A_{1u}	A_{1u}	A_{1g}	A_u	A_2	A_2	A_2	A_2	A_u	A_u	A_u
A_{2u}	A_{2u}	A_{2g}	B_{1u}	A_1	A_1	B_2	B_2	A_u	B_u	B_u
B_{1u}	A_{2u}	A_{1u}	B_{2u}	B_1	A_1	B_1	B_1	B_u	A_u	B_u
B_{2u}	A_{1u}	A_{2u}	B_{3u}	B_2	A_2	A_1	A_1	B_u	B_u	A_u
E_{1u}	E_u	E_u	$B_{2u} + B_{3u}$	E_1	E	$A_1 + B_1$	$A_1 + B_1$	$2B_u$	$A_u + B_u$	$A_u + B_u$
E_{2u}	E_u	E_u	$A_u + B_{1u}$	E_2	E	$A_2 + B_2$	$A_2 + B_2$	$2A_u$	$A_u + B_u$	$A_u + B_u$

Other subgroups: $D_6, 2D_{3h}, C_{6h}, C_6, C_{3h}, 2D_3, S_6, D_2, C_3, 3C_2, 3C_g, C_i$

T_d	T	D_{2d}	C_{3v}	C_{2v}
A_1	A	A_1	A_1	A_1
A_2	A	B_1	A_2	A_2
E	E	$A_1 + B_1$	E	$A_1 + A_2$
T_1	T	$A_2 + E$	$A_2 + E$	$A_2 + B_1 + B_2$
T_2	T	$B_2 + E$	$A_1 + E$	$A_1 + B_2 + B_1$

Other subgroups: S_4, D_2, C_3, C_2, C_s .

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O_h	O	T_d	T_h	D_{4h}	D_{3d}
A_{1g}	A_1	A_1	A_g	A_{1g}	A_{1g}
A_{2g}	A_2	A_2	A_g	B_{1g}	A_{2g}
E_g	E	E	E_g	$A_{1g} + B_{1g}$	E_g
T_{1g}	T_1	T_1	T_g	$A_{2g} + E_g$	$A_{2g} + E_g$
T_{2g}	T_2	T_2	T_g	$B_{2g} + E_g$	$A_{1g} + E_g$
A_{1u}	A_1	A_2	A_u	A_{1u}	A_{1u}
A_{2u}	A_2	A_1	A_u	B_{1u}	B_{1u}
E_u	E	E	E_u	$A_{1u} + B_{1u}$	E_u
T_{1u}	T_1	T_2	T_u	$A_{2u} + E_u$	$A_{2u} + E_u$
T_{2u}	T_2	T_1	T_u	$B_{2u} + E_u$	$A_{1u} + E_u$

Other subgroups: $T, D_4, D_{2d}, C_{4h}, C_{4v}, 2D_{2h}, D_3, C_{3v}, S_6, C_4, S_4, 3C_{2v}, 2D_2, 2C_{2h}, C_3, 2C_2, S_2, C_s$

R_3	O	D_4	D_3
S	A_1	A_1	A_1
P	T_1	$A_2 + E$	$A_2 + E$
D	$E + T_2$	$A_1 + B_1 + B_2 + E$	$A_1 + 2E$
F	$A_2 + T_1 + T_2$	$A_2 + B_1 + B_2 + 2E$	$A_1 + 2A_2 + 2E$
G	$A_1 + E + T_1 + T_2$	$2A_1 + A_2 + B_1 + B_2 + 2E$	$2A_1 + A_2 + 3E$
H	$E + 2T_1 + T_2$	$A_1 + 2A_2 + B_1 + B_2 + 3E$	$A_1 + 2A_2 + 4E$