Character Table 9

The Cubic Groups

T (23)	E	$4C_3$	$4C_3^2$	$3C_2$		$\varepsilon = \exp(2\pi i/3)$
A	1	1	1	1		$x^2 + y^2 + z^2$
E	$\begin{Bmatrix}1\\1\end{Bmatrix}$	$\begin{matrix}\varepsilon\\ \varepsilon^*\end{matrix}$	$\begin{matrix}\varepsilon^*\\ \varepsilon\end{matrix}$	$\begin{Bmatrix}1\\1\end{Bmatrix}$		$(\sqrt{3}\,(x^2-y^2)\,2z^2-x^2-y^2)$
T	3	0	0	–1	(x, y, z) (R_x, R_y, R_z)	(xy, xz, yz)

T_d ($\bar{4}3m$)	E	$8C_3$	$3C_2$	$6S_4$	$6\sigma_d$		
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		$(2z^2 - x^2 - y^2,\ \sqrt{3}\,(x^2 - y^2))$
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)

T_h ($m3$)	E	$4C_3$	$4C_3^2$	$3C_2$	i	$4S_6$	$4S_6^2$	$3\sigma_d$		$\varepsilon = \exp(2\pi i/3)$
A_g	1	1	1	1	1	1	1	1		$x^2 + y^2 + z^2$
E_g	$\begin{Bmatrix}1\\1\end{Bmatrix}$	$\begin{matrix}\varepsilon\\ \varepsilon^*\end{matrix}$	$\begin{matrix}\varepsilon^*\\ \varepsilon\end{matrix}$	$\begin{Bmatrix}1\\1\end{Bmatrix}$	$\begin{Bmatrix}1\\1\end{Bmatrix}$	$\begin{matrix}\varepsilon\\ \varepsilon^*\end{matrix}$	$\begin{matrix}\varepsilon^*\\ \varepsilon\end{matrix}$	$\begin{Bmatrix}1\\1\end{Bmatrix}$		$(2z^2 - x^2 - y^2,\ \sqrt{3}\,(x^2 - y^2))$
T_g	3	0	0	–1	3	0	0	–1	(R_x, R_y, R_z)	(xy, yz, xz)
A_u	1	1	1	1	–1	–1	–1	–1		
E_u	$\begin{Bmatrix}1\\1\end{Bmatrix}$	$\begin{matrix}\varepsilon\\ \varepsilon^*\end{matrix}$	$\begin{matrix}\varepsilon^*\\ \varepsilon\end{matrix}$	$\begin{Bmatrix}1\\1\end{Bmatrix}$	$\begin{Bmatrix}-1\\-1\end{Bmatrix}$	$\begin{matrix}-\varepsilon\\ -\varepsilon^*\end{matrix}$	$\begin{matrix}-\varepsilon^*\\ -\varepsilon\end{matrix}$	$\begin{Bmatrix}-1\\-1\end{Bmatrix}$		
T_u	3	0	0	–1	–3	0	0	1	(x, y, z)	

O (432)	E	$8C_3$	$3C_2$	$6C_4$	$6C_2'$		
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		$(2z^2 - x^2 - y^2,\ \sqrt{3}\,(x^2 - y^2))$
T_1	3	0	–1	1	–1	(x, y, z) (R_x, R_y, R_z)	
T_2	3	0	–1	–1	1		(xy, xz, yz)

Character Table 9 (cont…)

The Cubic Groups

O_h ($m3m$)	E	$8C_3$	$6C_2$	$6C_4$	$3C_2$ ($=C_4^2$)	i	$6S_4$	$8S_6$	$3\sigma_h$	$6\sigma_d$		
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		$(2z^2 - x^2 - y^2,$ $\sqrt{3}\,(x^2 - y^2))$
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		(xy, 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		
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		