

Summary of orientational relationships

η'

$$|h^{(1)}\rangle_\alpha = (001) ; |h^{(2)}\rangle_\alpha = (110)$$

η'	v^β	$ h^{(1)}\rangle_\beta$	$ h^{(2)}\rangle_\beta$	H^β
η'_g	1	(1 1 1)	(1 1 2)	$\bar{3}_p m_{x\bar{y}}$
η'_b	$4_{[001]}^+$	($\bar{1}$ 1 1)	($\bar{1}$ 1 $\bar{2}$)	$\bar{3}_r m_{xy}$
η'_r	$2_{[001]}$	($\bar{1}$ $\bar{1}$ 1)	($\bar{1}$ $\bar{1}$ $\bar{2}$)	$\bar{3}_q m_{x\bar{y}}$
η'_y	$4_{[001]}^-$	(1 $\bar{1}$ 1)	(1 $\bar{1}$ $\bar{2}$)	$\bar{3}_s m_{xy}$

$\Gamma_{\mathbf{A}1\eta'}^\star$

$$\begin{pmatrix} \frac{2}{3} & 0 & \frac{1}{6} \\ 0 & \frac{2}{3} & \frac{1}{6} \\ -\frac{2}{3} & -\frac{2}{3} & \frac{1}{6} \end{pmatrix}$$

$\Gamma_{\mathbf{A}1\eta'}$

$$\begin{pmatrix} 1 & -\frac{1}{2} & 2 \\ -\frac{1}{2} & 1 & 2 \\ -\frac{1}{2} & -\frac{1}{2} & 2 \end{pmatrix}$$

η_1

$$|h^{(1)}\rangle_\alpha = (001) ; |h^{(2)}\rangle_\alpha = (110)$$

η_1	ν^β	$ h^{(1)}\rangle_\beta$	$ h^{(2)}\rangle_\beta$	H^β
η_{1A}	1	(1 1 0)	(0 0 1)	$m_x \bar{y} m_x m_z$
η_{1B}	$2_{[010]}$	$(\bar{1} 1 0)$	(0 0 $\bar{1}$)	$m_x \bar{y} m_x m_z$
η_{1C}	$3_{[111]}$	(0 1 1)	(1 0 0)	$m_y \bar{z} m_y m_x$
η_{1D}	$3_{[1\bar{1}\bar{1}]}$	(0 $\bar{1}$ 1)	$(\bar{1} 0 0)$	$m_y \bar{z} m_y m_x$
η_{1E}	$3_{[\bar{1}11]}$	(1 0 1)	(0 1 0)	$m_z \bar{x} m_z m_y$
η_{1F}	$3_{[\bar{1}\bar{1}\bar{1}]}$	(1 0 $\bar{1}$)	(0 $\bar{1}$ 0)	$m_z \bar{x} m_z m_y$

$$\Gamma_{A1}^* \eta_1$$

$$\begin{pmatrix} 0 & \frac{aAl}{\sqrt{2} a\eta} & \frac{aAl}{\sqrt{2} c\eta} \\ 0 & -\frac{aAl}{\sqrt{2} a\eta} & \frac{aAl}{\sqrt{2} c\eta} \\ \frac{2 aAl}{\sqrt{3} a\eta} & \frac{aAl}{\sqrt{3} a\eta} & 0 \end{pmatrix}$$

$$\Gamma_{A1} \eta_1$$

$$\begin{pmatrix} -\frac{a\eta}{2\sqrt{2} aAl} & \frac{a\eta}{\sqrt{2} aAl} & \frac{c\eta}{\sqrt{2} aAl} \\ \frac{a\eta}{2\sqrt{2} aAl} & -\frac{a\eta}{\sqrt{2} aAl} & \frac{c\eta}{\sqrt{2} aAl} \\ \frac{\sqrt{3} a\eta}{2 aAl} & 0 & 0 \end{pmatrix}$$

η_2

$$|h^{(1)}\rangle_\alpha = (001); |h^{(2)}\rangle_\alpha = (100)$$

η_2	γ^β	$ h^{(1)}\rangle_\beta$	$ h^{(2)}\rangle_\beta$	H^β
η_{2A}	1	(1 $\bar{1}$ $\bar{1}$)	(1 1 0)	$\bar{3}_r m_{xy}$
η_{2B}	$2_{[100]}$	(1 1 1)	(1 $\bar{1}$ 0)	$\bar{3}_p m_{x\bar{y}}$
η_{2C}	$4_{\bar{1}100}$	(1 $\bar{1}$ 1)	(1 0 $\bar{1}$)	$\bar{3}_r m_{xy}$
η_{2D}	$4_{\bar{1}100}^+$	(1 1 $\bar{1}$)	(1 0 1)	$\bar{3}_q m_{x\bar{y}}$

$$\Gamma_{A1}^* \eta_2$$

$$\begin{pmatrix} \frac{\sqrt{\frac{2}{3}} aAl}{a\eta} & \frac{\sqrt{\frac{2}{3}} aAl}{a\eta} & \frac{aAl}{\sqrt{3} c\eta} \\ \frac{\sqrt{\frac{2}{3}} aAl}{a\eta} & 0 & -\frac{aAl}{\sqrt{3} c\eta} \\ 0 & \frac{\sqrt{\frac{2}{3}} aAl}{a\eta} & -\frac{aAl}{\sqrt{3} c\eta} \end{pmatrix}$$

$$\Gamma_{A1} \eta_2$$

$$\begin{pmatrix} \frac{a\eta}{\sqrt{6} aAl} & \frac{a\eta}{\sqrt{6} aAl} & \frac{c\eta}{\sqrt{3} aAl} \\ \frac{\sqrt{\frac{2}{3}} a\eta}{aAl} & -\frac{a\eta}{\sqrt{6} aAl} & -\frac{c\eta}{\sqrt{3} aAl} \\ -\frac{a\eta}{\sqrt{6} aAl} & \frac{\sqrt{\frac{2}{3}} a\eta}{aAl} & -\frac{c\eta}{\sqrt{3} aAl} \end{pmatrix}$$

η_3

$$|h^{(1)}\rangle_\alpha = (001) ; |h^{(2)}\rangle_\alpha = (110)$$

η_3	v^β	$ h^{(1)}\rangle_\beta$	$ h^{(2)}\rangle_\beta$	H^β
η_{3A}	1	(1 $\bar{1}$ $\bar{1}$)	(1 1 0)	$\bar{3}_r m_{xy}$
η_{3B}	$2_{[100]}$	(1 1 1)	(1 $\bar{1}$ 0)	$\bar{3}_p m_{x\bar{y}}$
η_{3C}	$4_{\bar{1}100}$	(1 $\bar{1}$ $\bar{1}$)	(1 0 $\bar{1}$)	$\bar{3}_s m_{xy}$
η_{3D}	$4_{\bar{1}100}^+$	(1 1 $\bar{1}$)	(1 0 1)	$\bar{3}_q m_{x\bar{y}}$

$$\Gamma_{A1}^* \eta_3$$

$$\begin{pmatrix} \frac{\sqrt{2} aAl}{3 a\eta} & \frac{2\sqrt{2} aAl}{3 a\eta} & \frac{aAl}{\sqrt{3} c\eta} \\ \frac{2\sqrt{2} aAl}{3 a\eta} & \frac{\sqrt{2} aAl}{3 a\eta} & -\frac{aAl}{\sqrt{3} c\eta} \\ -\frac{\sqrt{2} aAl}{3 a\eta} & \frac{\sqrt{2} aAl}{3 a\eta} & -\frac{aAl}{\sqrt{3} c\eta} \end{pmatrix}$$

$$\Gamma_{A1} \eta_3$$

$$\begin{pmatrix} 0 & \frac{a\eta}{\sqrt{2} aAl} & \frac{c\eta}{\sqrt{3} aAl} \\ \frac{a\eta}{\sqrt{2} aAl} & 0 & -\frac{c\eta}{\sqrt{3} aAl} \\ -\frac{a\eta}{\sqrt{2} aAl} & \frac{a\eta}{\sqrt{2} aAl} & -\frac{c\eta}{\sqrt{3} aAl} \end{pmatrix}$$

η_4

$$|h^{(1)}\rangle_\alpha = (001) ; |h^{(2)}\rangle_\alpha = (110)$$

η_4	v^β	$ h^{(1)}\rangle_\beta$	$ h^{(2)}\rangle_\beta$	H^β
η_{4A}	1	(1 1 0)	(1 $\bar{1}$ $\bar{1}$)	$2_{xy}/m_{xy}$
η_{4B}	$2_{[001]}$	($\bar{1}$ $\bar{1}$ 0)	($\bar{1}$ 1 $\bar{1}$)	$2_{xy}/m_{xy}$
η_{4C}	$2_{[010]}$	($\bar{1}$ 1 0)	($\bar{1}$ $\bar{1}$ 1)	$2_{x\bar{y}}/m_{x\bar{y}}$
η_{4D}	$2_{[100]}$	(1 $\bar{1}$ 0)	(1 1 1)	$2_{x\bar{y}}/m_{x\bar{y}}$
η_{4E}	$3_{[111]}^+$	(0 1 1)	($\bar{1}$ 1 $\bar{1}$)	$2_{yz}/m_{yz}$
η_{4F}	$3_{[\bar{1}\bar{1}\bar{1}]}^+$	(0 $\bar{1}$ $\bar{1}$)	($\bar{1}$ $\bar{1}$ 1)	$2_{yz}/m_{yz}$
η_{4G}	$3_{[1\bar{1}\bar{1}]}^+$	(0 $\bar{1}$ 1)	(1 $\bar{1}$ $\bar{1}$)	$2_{y\bar{z}}/m_{y\bar{z}}$
η_{4H}	$3_{[\bar{1}\bar{1}1]}^+$	(0 1 $\bar{1}$)	(1 1 1)	$2_{y\bar{z}}/m_{y\bar{z}}$
η_{4I}	$3_{[111]}^-$	(1 0 1)	($\bar{1}$ $\bar{1}$ 1)	$2_{zx}/m_{zx}$
η_{4J}	$3_{[\bar{1}\bar{1}\bar{1}]}^-$	($\bar{1}$ 0 $\bar{1}$)	(1 $\bar{1}$ $\bar{1}$)	$2_{zx}/m_{zx}$
η_{4K}	$3_{[\bar{1}\bar{1}1]}^-$	(1 0 $\bar{1}$)	($\bar{1}$ 1 1)	$2_{z\bar{x}}/m_{z\bar{x}}$
η_{4L}	$3_{[\bar{1}1\bar{1}]}^-$	($\bar{1}$ 0 1)	(1 1 1)	$2_{z\bar{x}}/m_{z\bar{x}}$

$$\Gamma_{A1}^* \eta_4$$

$$\begin{pmatrix} \frac{\sqrt{2}}{3} \frac{aAl}{a\eta} & \frac{(\sqrt{2}+2\sqrt{3})aAl}{6a\eta} & \frac{aAl}{\sqrt{2}c\eta} \\ -\frac{\sqrt{2}}{3} \frac{aAl}{a\eta} & -\frac{(\sqrt{2}+2\sqrt{3})aAl}{6a\eta} & \frac{aAl}{\sqrt{2}c\eta} \\ \frac{2\sqrt{2}}{3} \frac{aAl}{a\eta} & \frac{(\sqrt{2}-\sqrt{3})aAl}{3a\eta} & 0 \end{pmatrix}$$

$$\Gamma_{A1} \eta_4$$

$$\begin{pmatrix} \frac{(-2+\sqrt{6})a\eta}{4\sqrt{3}aAl} & \frac{a\eta}{\sqrt{3}aAl} & \frac{c\eta}{\sqrt{2}aAl} \\ -\frac{(-2+\sqrt{6})a\eta}{4\sqrt{3}aAl} & -\frac{a\eta}{\sqrt{3}aAl} & \frac{c\eta}{\sqrt{2}aAl} \\ \frac{\sqrt{\frac{1}{3}(7+2\sqrt{6})}a\eta}{2aAl} & -\frac{a\eta}{\sqrt{3}aAl} & 0 \end{pmatrix}$$

η_5

$$|h^{(1)}\rangle_\alpha = (\bar{1} 20); |h^{(2)}\rangle_\alpha = (302)$$

η_5	v^β	$ h^{(1)}\rangle_\beta$	$ h^{(2)}\rangle_\beta$	H^β
η_{5A}	1	(1 $\bar{1}$ $\bar{1}$)	(1 1 0)	$\bar{1}$
η_{5B}	$2_{[001]}$	($\bar{1}$ 1 $\bar{1}$)	($\bar{1}$ $\bar{1}$ 0)	$\bar{1}$
η_{5C}	$2_{[010]}$	($\bar{1}$ $\bar{1}$ 1)	($\bar{1}$ 1 0)	$\bar{1}$
η_{5D}	$2_{[100]}$	(1 1 1)	(1 $\bar{1}$ 0)	$\bar{1}$
η_{5E}	$3_{[111]}^+$	($\bar{1}$ 1 $\bar{1}$)	(0 1 1)	$\bar{1}$
η_{5F}	$3_{[\bar{1}\bar{1}\bar{1}]}^+$	($\bar{1}$ $\bar{1}$ 1)	(0 $\bar{1}$ $\bar{1}$)	$\bar{1}$
η_{5G}	$3_{[1\bar{1}\bar{1}]}^+$	(1 $\bar{1}$ $\bar{1}$)	(0 $\bar{1}$ 1)	$\bar{1}$
η_{5H}	$3_{[\bar{1}\bar{1}1]}^+$	(1 1 1)	(0 1 $\bar{1}$)	$\bar{1}$
η_{5I}	$3_{[\bar{1}11]}^-$	($\bar{1}$ $\bar{1}$ 1)	(1 0 1)	$\bar{1}$
η_{5J}	$3_{[1\bar{1}\bar{1}]}^-$	(1 $\bar{1}$ $\bar{1}$)	($\bar{1}$ 0 $\bar{1}$)	$\bar{1}$
η_{5K}	$3_{[\bar{1}\bar{1}\bar{1}]}^-$	($\bar{1}$ 1 $\bar{1}$)	(1 0 $\bar{1}$)	$\bar{1}$
η_{5L}	$3_{[\bar{1}1\bar{1}]}^-$	(1 1 1)	($\bar{1}$ 0 1)	$\bar{1}$
η_{5M}	$2_{[110]}$	($\bar{1}$ 1 1)	(1 1 0)	$\bar{1}$
η_{5N}	$2_{[1\bar{1}0]}$	(1 $\bar{1}$ 1)	($\bar{1}$ $\bar{1}$ 0)	$\bar{1}$
η_{5O}	$4_{[\bar{0}01]}^-$	($\bar{1}$ $\bar{1}$ $\bar{1}$)	(1 $\bar{1}$ 0)	$\bar{1}$
η_{5P}	$4_{[001]}^+$	(1 1 $\bar{1}$)	($\bar{1}$ 1 0)	$\bar{1}$
η_{5Q}	$4_{[\bar{1}00]}^-$	(1 $\bar{1}$ 1)	(1 0 $\bar{1}$)	$\bar{1}$
η_{5R}	$2_{[011]}$	($\bar{1}$ $\bar{1}$ $\bar{1}$)	($\bar{1}$ 0 1)	$\bar{1}$
η_{5S}	$2_{[01\bar{1}]}$	($\bar{1}$ 1 1)	($\bar{1}$ 0 $\bar{1}$)	$\bar{1}$
η_{5T}	$4_{[\bar{1}00]}^+$	(1 1 $\bar{1}$)	(1 0 1)	$\bar{1}$
η_{5U}	$4_{[010]}^+$	($\bar{1}$ $\bar{1}$ $\bar{1}$)	(0 1 $\bar{1}$)	$\bar{1}$
η_{5V}	$2_{[101]}$	($\bar{1}$ 1 1)	(0 $\bar{1}$ 1)	$\bar{1}$
η_{5W}	$4_{[010]}^-$	(1 $\bar{1}$ 1)	(0 1 1)	$\bar{1}$
η_{5X}	$2_{[\bar{1}01]}$	(1 1 $\bar{1}$)	(0 $\bar{1}$ $\bar{1}$)	$\bar{1}$

$\Gamma_{A1\eta_5}^*$

$$\left(\begin{array}{ccc} \frac{\sqrt{2} aAl \left(\frac{3c\eta}{a\eta} + 1 \right)}{3 a\eta \sqrt{\frac{3c\eta^2}{a\eta^2} + 1}} & \frac{aAl \left(\frac{3\sqrt{2} c\eta}{a\eta} + 2\sqrt{3} \sqrt{\frac{3c\eta^2}{a\eta^2} + 1} + \sqrt{2} \right)}{6 a\eta \sqrt{\frac{3c\eta^2}{a\eta^2} + 1}} & - \frac{aAl \left(\frac{c\eta}{a\eta} - 1 \right)}{\sqrt{2} c\eta \sqrt{\frac{3c\eta^2}{a\eta^2} + 1}} \\ \frac{\sqrt{2} aAl \left(\frac{3c\eta}{a\eta} - 1 \right)}{3 a\eta \sqrt{\frac{3c\eta^2}{a\eta^2} + 1}} & \frac{aAl \left(\frac{3\sqrt{2} c\eta}{a\eta} - 2\sqrt{3} \sqrt{\frac{3c\eta^2}{a\eta^2} + 1} - \sqrt{2} \right)}{6 a\eta \sqrt{\frac{3c\eta^2}{a\eta^2} + 1}} & \frac{aAl \left(\frac{c\eta}{a\eta} + 1 \right)}{\sqrt{2} c\eta \sqrt{\frac{3c\eta^2}{a\eta^2} + 1}} \\ \frac{2\sqrt{2} aAl}{3 a\eta \sqrt{\frac{3c\eta^2}{a\eta^2} + 1}} & - \frac{aAl \left(\sqrt{3} \sqrt{\frac{3c\eta^2}{a\eta^2} + 1} - \sqrt{2} \right)}{3 a\eta \sqrt{\frac{3c\eta^2}{a\eta^2} + 1}} & - \frac{\sqrt{2} aAl}{a\eta \sqrt{\frac{3c\eta^2}{a\eta^2} + 1}} \end{array} \right)$$

 $\Gamma_{A1\eta_5}$

$$\left(\begin{array}{ccc} \frac{a\eta \left(\frac{9\sqrt{2} c\eta}{a\eta} - 2\sqrt{3} \sqrt{\frac{3c\eta^2}{a\eta^2} + 1} + 3\sqrt{2} \right)}{12 aAl \sqrt{\frac{3c\eta^2}{a\eta^2} + 1}} & \frac{a\eta}{\sqrt{3} aAl} & - \frac{c\eta \left(\frac{c\eta}{a\eta} - 1 \right)}{\sqrt{2} aAl \sqrt{\frac{3c\eta^2}{a\eta^2} + 1}} \\ \frac{a\eta \left(\frac{9\sqrt{2} c\eta}{a\eta} + 2\sqrt{3} \sqrt{\frac{3c\eta^2}{a\eta^2} + 1} - 3\sqrt{2} \right)}{12 aAl \sqrt{\frac{3c\eta^2}{a\eta^2} + 1}} & - \frac{a\eta}{\sqrt{3} aAl} & \frac{c\eta \left(\frac{c\eta}{a\eta} + 1 \right)}{\sqrt{2} aAl \sqrt{\frac{3c\eta^2}{a\eta^2} + 1}} \\ \frac{a\eta \left(\sqrt{3} \sqrt{\frac{3c\eta^2}{a\eta^2} + 1} + 3\sqrt{2} \right)}{6 aAl \sqrt{\frac{3c\eta^2}{a\eta^2} + 1}} & - \frac{a\eta}{\sqrt{3} aAl} & - \frac{\sqrt{2} c\eta^2}{aAl a\eta \sqrt{\frac{3c\eta^2}{a\eta^2} + 1}} \end{array} \right)$$

η_6

$$|h^{(1)}\rangle_\alpha = (\bar{1} 20); |h^{(2)}\rangle_\alpha = (201)$$

η_6	v^β	$ h^{(1)}\rangle_\beta$	$ h^{(2)}\rangle_\beta$	H^β
η_{6A}	1	(1 $\bar{1}$ $\bar{1}$)	(1 $\bar{1}$ 2)	$\bar{1}$
η_{6B}	$2_{[001]}$	($\bar{1}$ 1 $\bar{1}$)	($\bar{1}$ 1 2)	$\bar{1}$
η_{6C}	$2_{[010]}$	($\bar{1}$ $\bar{1}$ 1)	($\bar{1}$ $\bar{1}$ 2)	$\bar{1}$
η_{6D}	$2_{[100]}$	(1 1 1)	(1 1 $\bar{2}$)	$\bar{1}$
η_{6E}	$3_{[111]}^+$	($\bar{1}$ 1 $\bar{1}$)	(2 1 $\bar{1}$)	$\bar{1}$
η_{6F}	$3_{[\bar{1}\bar{1}\bar{1}]}^+$	($\bar{1}$ $\bar{1}$ 1)	(2 $\bar{1}$ 1)	$\bar{1}$
η_{6G}	$3_{[1\bar{1}\bar{1}]}^+$	(1 $\bar{1}$ $\bar{1}$)	($\bar{2}$ $\bar{1}$ $\bar{1}$)	$\bar{1}$
η_{6H}	$3_{[\bar{1}\bar{1}1]}^+$	(1 1 1)	($\bar{2}$ 1 1)	$\bar{1}$
η_{6I}	$3_{[\bar{1}11]}^-$	($\bar{1}$ $\bar{1}$ 1)	($\bar{1}$ 2 1)	$\bar{1}$
η_{6J}	$3_{[1\bar{1}\bar{1}]}^-$	(1 $\bar{1}$ $\bar{1}$)	(1 2 $\bar{1}$)	$\bar{1}$
η_{6K}	$3_{[\bar{1}\bar{1}\bar{1}]}^-$	($\bar{1}$ 1 $\bar{1}$)	($\bar{1}$ $\bar{2}$ $\bar{1}$)	$\bar{1}$
η_{6L}	$3_{[\bar{1}1\bar{1}]}^-$	(1 1 1)	(1 2 1)	$\bar{1}$
η_{6M}	$2_{[110]}$	($\bar{1}$ 1 1)	($\bar{1}$ 1 $\bar{2}$)	$\bar{1}$
η_{6N}	$2_{[1\bar{1}0]}$	(1 $\bar{1}$ 1)	(1 $\bar{1}$ $\bar{2}$)	$\bar{1}$
η_{6O}	$4_{[001]}^-$	($\bar{1}$ $\bar{1}$ $\bar{1}$)	($\bar{1}$ $\bar{1}$ 2)	$\bar{1}$
η_{6P}	$4_{[001]}^+$	(1 1 $\bar{1}$)	(1 1 2)	$\bar{1}$
η_{6Q}	$4_{[100]}^-$	(1 $\bar{1}$ 1)	(1 2 1)	$\bar{1}$
η_{6R}	$2_{[011]}$	($\bar{1}$ $\bar{1}$ $\bar{1}$)	($\bar{1}$ 2 $\bar{1}$)	$\bar{1}$
η_{6S}	$2_{[01\bar{1}]}$	($\bar{1}$ 1 1)	($\bar{1}$ $\bar{2}$ 1)	$\bar{1}$
η_{6T}	$4_{[100]}^+$	(1 1 $\bar{1}$)	(1 $\bar{2}$ $\bar{1}$)	$\bar{1}$
η_{6U}	$4_{[010]}^+$	($\bar{1}$ $\bar{1}$ $\bar{1}$)	(2 $\bar{1}$ $\bar{1}$)	$\bar{1}$
η_{6V}	$2_{[101]}$	($\bar{1}$ 1 1)	(2 1 1)	$\bar{1}$
η_{6W}	$4_{[010]}^-$	(1 $\bar{1}$ 1)	($\bar{2}$ $\bar{1}$ 1)	$\bar{1}$
η_{6X}	$2_{[\bar{1}01]}$	(1 1 $\bar{1}$)	($\bar{2}$ 1 $\bar{1}$)	$\bar{1}$

$\Gamma_{A1\eta_6}^*$

$$\left(\begin{array}{ccc} \frac{\sqrt{2} aAl \left(\frac{4c\eta}{a\eta} - 3\right)}{3 a\eta \sqrt{\frac{16c\eta^2}{a\eta^2} + 3}} & \frac{aAl \left(\frac{4\sqrt{2}c\eta}{a\eta} + 2\sqrt{3} \sqrt{\frac{16c\eta^2}{a\eta^2} + 3} - 3\sqrt{2}\right)}{6 a\eta \sqrt{\frac{16c\eta^2}{a\eta^2} + 3}} & \frac{aAl \left(\frac{4c\eta}{a\eta} + 1\right)}{\sqrt{2} c\eta \sqrt{\frac{16c\eta^2}{a\eta^2} + 3}} \\ - \frac{\sqrt{2} aAl \left(\frac{4c\eta}{a\eta} + 3\right)}{3 a\eta \sqrt{\frac{16c\eta^2}{a\eta^2} + 3}} & - \frac{aAl \left(\frac{4\sqrt{2}c\eta}{a\eta} + 2\sqrt{3} \sqrt{\frac{16c\eta^2}{a\eta^2} + 3} + 3\sqrt{2}\right)}{6 a\eta \sqrt{\frac{16c\eta^2}{a\eta^2} + 3}} & - \frac{aAl \left(\frac{4c\eta}{a\eta} - 1\right)}{\sqrt{2} c\eta \sqrt{\frac{16c\eta^2}{a\eta^2} + 3}} \\ \frac{8\sqrt{2} aAl c\eta}{3 a\eta^2 \sqrt{\frac{16c\eta^2}{a\eta^2} + 3}} & - \frac{aAl \left(\sqrt{3} \sqrt{\frac{16c\eta^2}{a\eta^2} + 3} - \frac{4\sqrt{2}c\eta}{a\eta}\right)}{3 a\eta \sqrt{\frac{16c\eta^2}{a\eta^2} + 3}} & \frac{\sqrt{2} aAl}{c\eta \sqrt{\frac{16c\eta^2}{a\eta^2} + 3}} \end{array} \right)$$

 $\Gamma_{A1\eta_6}$

$$\left(\begin{array}{ccc} \frac{a\eta \left(-\frac{12\sqrt{2}c\eta}{a\eta} + 2\sqrt{3} \sqrt{\frac{16c\eta^2}{a\eta^2} + 3} + 9\sqrt{2}\right)}{12 aAl \sqrt{\frac{16c\eta^2}{a\eta^2} + 3}} & \frac{a\eta}{\sqrt{3} aAl} & \frac{c\eta \left(\frac{4c\eta}{a\eta} + 1\right)}{\sqrt{2} aAl \sqrt{\frac{16c\eta^2}{a\eta^2} + 3}} \\ \frac{a\eta \left(-\frac{12\sqrt{2}c\eta}{a\eta} + 2\sqrt{3} \sqrt{\frac{16c\eta^2}{a\eta^2} + 3} - 9\sqrt{2}\right)}{12 aAl \sqrt{\frac{16c\eta^2}{a\eta^2} + 3}} & - \frac{a\eta}{\sqrt{3} aAl} & - \frac{c\eta \left(\frac{4c\eta}{a\eta} - 1\right)}{\sqrt{2} aAl \sqrt{\frac{16c\eta^2}{a\eta^2} + 3}} \\ \frac{a\eta \left(\frac{4\sqrt{6}c\eta}{a\eta} + \sqrt{\frac{16c\eta^2}{a\eta^2} + 3}\right)}{2\sqrt{3} aAl \sqrt{\frac{16c\eta^2}{a\eta^2} + 3}} & - \frac{a\eta}{\sqrt{3} aAl} & \frac{\sqrt{2} c\eta}{aAl \sqrt{\frac{16c\eta^2}{a\eta^2} + 3}} \end{array} \right)$$

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$$|h^{(1)}\rangle_{\alpha} = (\bar{1} 20); |h^{(2)}\rangle_{\alpha} = (104)$$

η_{γ}	v^{β}	$ h^{(1)}\rangle_{\beta}$	$ h^{(2)}\rangle_{\beta}$	H^{β}
η_{7A}	1	(1 $\bar{1}$ $\bar{1}$)	(1 1 0)	$\bar{1}$
η_{7B}	$2_{[001]}$	($\bar{1}$ 1 $\bar{1}$)	($\bar{1}$ $\bar{1}$ 0)	$\bar{1}$
η_{7C}	$2_{[010]}$	($\bar{1}$ $\bar{1}$ 1)	($\bar{1}$ 1 0)	$\bar{1}$
η_{7D}	$2_{[100]}$	(1 1 1)	(1 $\bar{1}$ 0)	$\bar{1}$
η_{7E}	$3_{[111]}^{+}$	($\bar{1}$ 1 $\bar{1}$)	(0 1 1)	$\bar{1}$
η_{7F}	$3_{[\bar{1}\bar{1}\bar{1}]}^{+}$	($\bar{1}$ $\bar{1}$ 1)	(0 $\bar{1}$ $\bar{1}$)	$\bar{1}$
η_{7G}	$3_{[1\bar{1}\bar{1}]}^{+}$	(1 $\bar{1}$ $\bar{1}$)	(0 $\bar{1}$ 1)	$\bar{1}$
η_{7H}	$3_{[\bar{1}\bar{1}1]}^{+}$	(1 1 1)	(0 1 $\bar{1}$)	$\bar{1}$
η_{7I}	$3_{[\bar{1}11]}^{-}$	($\bar{1}$ $\bar{1}$ 1)	(1 0 1)	$\bar{1}$
η_{7J}	$3_{[1\bar{1}\bar{1}]}^{-}$	(1 $\bar{1}$ $\bar{1}$)	($\bar{1}$ 0 $\bar{1}$)	$\bar{1}$
η_{7K}	$3_{[\bar{1}\bar{1}1]}^{-}$	($\bar{1}$ 1 $\bar{1}$)	(1 0 $\bar{1}$)	$\bar{1}$
η_{7L}	$3_{[\bar{1}1\bar{1}]}^{-}$	(1 1 1)	($\bar{1}$ 0 1)	$\bar{1}$
η_{7M}	$2_{[110]}$	($\bar{1}$ 1 1)	(1 1 0)	$\bar{1}$
η_{7N}	$2_{[1\bar{1}0]}$	(1 $\bar{1}$ 1)	($\bar{1}$ $\bar{1}$ 0)	$\bar{1}$
η_{7O}	$4_{[\bar{0}01]}^{-}$	($\bar{1}$ $\bar{1}$ $\bar{1}$)	(1 $\bar{1}$ 0)	$\bar{1}$
η_{7P}	$4_{[\bar{0}01]}^{+}$	(1 1 $\bar{1}$)	($\bar{1}$ 1 0)	$\bar{1}$
η_{7Q}	$4_{[\bar{1}00]}^{-}$	(1 $\bar{1}$ 1)	(1 0 $\bar{1}$)	$\bar{1}$
η_{7R}	$2_{[011]}$	($\bar{1}$ $\bar{1}$ $\bar{1}$)	($\bar{1}$ 0 1)	$\bar{1}$
η_{7S}	$2_{[01\bar{1}]}$	($\bar{1}$ 1 1)	($\bar{1}$ 0 $\bar{1}$)	$\bar{1}$
η_{7T}	$4_{[\bar{1}00]}^{+}$	(1 1 $\bar{1}$)	(1 0 1)	$\bar{1}$
η_{7U}	$4_{[\bar{0}10]}^{+}$	($\bar{1}$ $\bar{1}$ $\bar{1}$)	(0 1 $\bar{1}$)	$\bar{1}$
η_{7V}	$2_{[101]}$	($\bar{1}$ 1 1)	(0 $\bar{1}$ 1)	$\bar{1}$
η_{7W}	$4_{[\bar{0}10]}^{-}$	(1 $\bar{1}$ 1)	(0 1 1)	$\bar{1}$
η_{7X}	$2_{[\bar{1}01]}$	(1 1 $\bar{1}$)	(0 $\bar{1}$ $\bar{1}$)	$\bar{1}$

$\Gamma_{\mathbf{A}1\eta_7}^*$

$$\left(\begin{array}{ccc} \frac{\sqrt{\frac{2}{3}} \mathbf{aAl} \left(\frac{c\eta}{a\eta} + 2 \right)}{a\eta \sqrt{\frac{c\eta^2}{a\eta^2} + 12}} & \frac{\mathbf{aAl} \left(\frac{\sqrt{2} c\eta}{a\eta} + 2 \sqrt{\frac{c\eta^2}{a\eta^2} + 12} + 2\sqrt{2} \right)}{2\sqrt{3} a\eta \sqrt{\frac{c\eta^2}{a\eta^2} + 12}} & - \frac{\mathbf{aAl} \left(\frac{c\eta}{a\eta} - 6 \right)}{\sqrt{6} c\eta \sqrt{\frac{c\eta^2}{a\eta^2} + 12}} \\ \frac{\sqrt{\frac{2}{3}} \mathbf{aAl} \left(\frac{c\eta}{a\eta} - 2 \right)}{a\eta \sqrt{\frac{c\eta^2}{a\eta^2} + 12}} & \frac{\mathbf{aAl} \left(\frac{\sqrt{2} c\eta}{a\eta} - 2 \sqrt{\frac{c\eta^2}{a\eta^2} + 12} - 2\sqrt{2} \right)}{2\sqrt{3} a\eta \sqrt{\frac{c\eta^2}{a\eta^2} + 12}} & \frac{\mathbf{aAl} \left(\frac{c\eta}{a\eta} + 6 \right)}{\sqrt{6} c\eta \sqrt{\frac{c\eta^2}{a\eta^2} + 12}} \\ \frac{4\sqrt{\frac{2}{3}} \mathbf{aAl}}{a\eta \sqrt{\frac{c\eta^2}{a\eta^2} + 12}} & \frac{\mathbf{aAl} \left(2\sqrt{2} - \sqrt{\frac{c\eta^2}{a\eta^2} + 12} \right)}{\sqrt{3} a\eta \sqrt{\frac{c\eta^2}{a\eta^2} + 12}} & - \frac{\sqrt{\frac{2}{3}} \mathbf{aAl}}{a\eta \sqrt{\frac{c\eta^2}{a\eta^2} + 12}} \end{array} \right)$$

 $\Gamma_{\mathbf{A}1\eta_7}$

$$\left(\begin{array}{ccc} \frac{a\eta \left(\frac{3\sqrt{2} c\eta}{a\eta} - 2 \sqrt{\frac{c\eta^2}{a\eta^2} + 12} + 6\sqrt{2} \right)}{4\sqrt{3} \mathbf{aAl} \sqrt{\frac{c\eta^2}{a\eta^2} + 12}} & \frac{a\eta}{\sqrt{3} \mathbf{aAl}} & - \frac{c\eta \left(\frac{c\eta}{a\eta} - 6 \right)}{\sqrt{6} \mathbf{aAl} \sqrt{\frac{c\eta^2}{a\eta^2} + 12}} \\ \frac{a\eta \left(\frac{3\sqrt{2} c\eta}{a\eta} + 2 \sqrt{\frac{c\eta^2}{a\eta^2} + 12} - 6\sqrt{2} \right)}{4\sqrt{3} \mathbf{aAl} \sqrt{\frac{c\eta^2}{a\eta^2} + 12}} & - \frac{a\eta}{\sqrt{3} \mathbf{aAl}} & \frac{c\eta \left(\frac{c\eta}{a\eta} + 6 \right)}{\sqrt{6} \mathbf{aAl} \sqrt{\frac{c\eta^2}{a\eta^2} + 12}} \\ \frac{a\eta \left(\sqrt{\frac{c\eta^2}{a\eta^2} + 12} + 6\sqrt{2} \right)}{2\sqrt{3} \mathbf{aAl} \sqrt{\frac{c\eta^2}{a\eta^2} + 12}} & - \frac{a\eta}{\sqrt{3} \mathbf{aAl}} & - \frac{\sqrt{\frac{2}{3}} c\eta^2}{\mathbf{aAl} a\eta \sqrt{\frac{c\eta^2}{a\eta^2} + 12}} \end{array} \right)$$

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$$|h^{(1)}\rangle_\alpha = (001); |h^{(2)}\rangle_\alpha = (\bar{1}20)$$

η_S	v^β	$ h^{(1)}\rangle_\beta$	$ h^{(2)}\rangle_\beta$	H^β
η_{8A}	1	(3 1 $\bar{1}$)	(1 $\bar{1}$ 2)	$\bar{1}$
η_{8B}	$2_{[001]}$	($\bar{3}$ $\bar{1}$ $\bar{1}$)	($\bar{1}$ 1 2)	$\bar{1}$
η_{8C}	$2_{[010]}$	($\bar{3}$ 1 1)	($\bar{1}$ $\bar{1}$ 2)	$\bar{1}$
η_{8D}	$2_{[100]}$	(3 $\bar{1}$ 1)	(1 1 $\bar{2}$)	$\bar{1}$
η_{8E}	$3_{[111]}^+$	($\bar{1}$ 3 1)	(2 1 $\bar{1}$)	$\bar{1}$
η_{8F}	$3_{[\bar{1}\bar{1}\bar{1}]}^+$	($\bar{1}$ $\bar{3}$ $\bar{1}$)	(2 $\bar{1}$ 1)	$\bar{1}$
η_{8G}	$3_{[1\bar{1}\bar{1}]}^+$	(1 $\bar{3}$ 1)	($\bar{2}$ $\bar{1}$ $\bar{1}$)	$\bar{1}$
η_{8H}	$3_{[\bar{1}\bar{1}1]}^+$	(1 3 $\bar{1}$)	($\bar{2}$ 1 1)	$\bar{1}$
η_{8I}	$3_{[\bar{1}11]}^+$	(1 $\bar{1}$ 3)	($\bar{1}$ 2 1)	$\bar{1}$
η_{8J}	$3_{[1\bar{1}\bar{1}]}^+$	($\bar{1}$ $\bar{1}$ $\bar{3}$)	(1 2 $\bar{1}$)	$\bar{1}$
η_{8K}	$3_{[\bar{1}\bar{1}1]}^+$	(1 1 $\bar{3}$)	($\bar{1}$ $\bar{2}$ $\bar{1}$)	$\bar{1}$
η_{8L}	$3_{[\bar{1}1\bar{1}]}^+$	($\bar{1}$ 1 3)	(1 2 1)	$\bar{1}$
η_{8M}	$2_{[110]}$	(1 3 1)	($\bar{1}$ 1 $\bar{2}$)	$\bar{1}$
η_{8N}	$2_{[1\bar{1}0]}$	($\bar{1}$ $\bar{3}$ 1)	(1 $\bar{1}$ $\bar{2}$)	$\bar{1}$
η_{8O}	$4_{[001]}^-$	(1 $\bar{3}$ $\bar{1}$)	($\bar{1}$ $\bar{1}$ 2)	$\bar{1}$
η_{8P}	$4_{[001]}^+$	($\bar{1}$ 3 $\bar{1}$)	(1 1 2)	$\bar{1}$
η_{8Q}	$4_{[100]}^-$	(3 $\bar{1}$ $\bar{1}$)	(1 2 1)	$\bar{1}$
η_{8R}	$2_{[011]}$	($\bar{3}$ $\bar{1}$ 1)	($\bar{1}$ 2 $\bar{1}$)	$\bar{1}$
η_{8S}	$2_{[01\bar{1}]}$	($\bar{3}$ 1 $\bar{1}$)	($\bar{1}$ $\bar{2}$ 1)	$\bar{1}$
η_{8T}	$4_{[100]}^+$	(3 1 1)	(1 $\bar{2}$ $\bar{1}$)	$\bar{1}$
η_{8U}	$4_{[010]}^+$	($\bar{1}$ 1 $\bar{3}$)	(2 $\bar{1}$ $\bar{1}$)	$\bar{1}$
η_{8V}	$2_{[101]}$	($\bar{1}$ $\bar{1}$ 3)	(2 1 1)	$\bar{1}$
η_{8W}	$4_{[010]}^-$	(1 1 3)	($\bar{2}$ $\bar{1}$ 1)	$\bar{1}$
η_{8X}	$2_{[\bar{1}01]}$	(1 $\bar{1}$ $\bar{3}$)	($\bar{2}$ 1 $\bar{1}$)	$\bar{1}$

$\Gamma_{A1}^* \eta_8$

$$\begin{pmatrix} -\frac{\sqrt{\frac{2}{11}} aAl}{3 a\eta} & \frac{\left(\frac{1}{\sqrt{6}} - \frac{1}{3\sqrt{22}}\right) aAl}{a\eta} & \frac{3 aAl}{\sqrt{11} c\eta} \\ 7\frac{\sqrt{\frac{2}{11}} aAl}{3 a\eta} & \frac{\left(-\frac{1}{\sqrt{6}} + \frac{7}{3\sqrt{22}}\right) aAl}{a\eta} & \frac{aAl}{\sqrt{11} c\eta} \\ 4\frac{\sqrt{\frac{2}{11}} aAl}{3 a\eta} & \frac{(11\sqrt{6} + 2\sqrt{22}) aAl}{33 a\eta} & -\frac{aAl}{\sqrt{11} c\eta} \end{pmatrix}$$

$\Gamma_{A1} \eta_8$

$$\begin{pmatrix} -\frac{(11+\sqrt{33}) a\eta}{22\sqrt{6} aAl} & \frac{a\eta}{\sqrt{6} aAl} & \frac{3 c\eta}{\sqrt{11} aAl} \\ \frac{(11+7\sqrt{33}) a\eta}{22\sqrt{6} aAl} & -\frac{a\eta}{\sqrt{6} aAl} & \frac{c\eta}{\sqrt{11} aAl} \\ \frac{a\eta}{\sqrt{66(23+4\sqrt{33})} aAl} & \frac{\sqrt{\frac{2}{3}} a\eta}{aAl} & -\frac{c\eta}{\sqrt{11} aAl} \end{pmatrix}$$

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$$|h^{(1)}\rangle_{\alpha} = (001) ; |h^{(2)}\rangle_{\alpha} = (\bar{1}20)$$

η_9	v^{β}	$ h^{(1)}\rangle_{\beta}$	$ h^{(2)}\rangle_{\beta}$	H^{β}
η_{9A}	1	(1 1 0)	(0 0 1)	$m_x \bar{y} m_x m_z$
η_{9B}	$2_{[010]}$	($\bar{1}$ 1 0)	(0 0 $\bar{1}$)	$m_x \bar{y} m_x m_z$
η_{9C}	$3_{[\bar{1}11]}^+$	(0 1 1)	(1 0 0)	$m_y \bar{z} m_y m_x$
η_{9D}	$3_{[1\bar{1}\bar{1}]}^+$	(0 $\bar{1}$ 1)	($\bar{1}$ 0 0)	$m_y \bar{z} m_y m_x$
η_{9E}	$3_{[\bar{1}11]}^-$	(1 0 1)	(0 1 0)	$m_z \bar{x} m_z m_y$
η_{9F}	$3_{[\bar{1}\bar{1}\bar{1}]}^-$	(1 0 $\bar{1}$)	(0 $\bar{1}$ 0)	$m_z \bar{x} m_z m_y$

$$\Gamma_{A1}^* \eta_9$$

$$\begin{pmatrix} -\frac{\sqrt{\frac{2}{3}} aAl}{a\eta} & -\frac{aAl}{\sqrt{6} a\eta} & \frac{aAl}{\sqrt{2} c\eta} \\ \frac{\sqrt{\frac{2}{3}} aAl}{a\eta} & \frac{aAl}{\sqrt{6} a\eta} & \frac{aAl}{\sqrt{2} c\eta} \\ 0 & \frac{aAl}{a\eta} & 0 \end{pmatrix}$$

$$\Gamma_{A1} \eta_9$$

$$\begin{pmatrix} -\frac{\sqrt{\frac{3}{2}} a\eta}{2 aAl} & 0 & \frac{c\eta}{\sqrt{2} aAl} \\ \frac{\sqrt{\frac{3}{2}} a\eta}{2 aAl} & 0 & \frac{c\eta}{\sqrt{2} aAl} \\ -\frac{a\eta}{2 aAl} & \frac{a\eta}{aAl} & 0 \end{pmatrix}$$

η_{10}

$$|h^{(1)}\rangle_{\alpha} = (001) ; |h^{(2)}\rangle_{\alpha} = (110)$$

η_{10}	v^{β}	$ h^{(1)}\rangle_{\beta}$	$ h^{(2)}\rangle_{\beta}$	H^{β}
η_{10A}	1	(1 $\bar{1}$ $\bar{1}$)	(1 $\bar{3}$ 4)	$\bar{3}_r$
η_{10B}	$2_{[001]}$	($\bar{1}$ 1 $\bar{1}$)	($\bar{1}$ 3 4)	$\bar{3}_s$
η_{10C}	$2_{[010]}$	($\bar{1}$ $\bar{1}$ 1)	($\bar{1}$ $\bar{3}$ 4)	$\bar{3}_q$
η_{10D}	$2_{[100]}$	(1 1 1)	(1 3 4)	$\bar{3}_p$
η_{10E}	$4_{[100]}^{-}$	(1 $\bar{1}$ 1)	(1 4 3)	$\bar{3}_s$
η_{10F}	$2_{[011]}$	($\bar{1}$ $\bar{1}$ $\bar{1}$)	($\bar{1}$ 4 $\bar{3}$)	$\bar{3}_p$
η_{10G}	$2_{[01\bar{1}]}$	($\bar{1}$ 1 1)	($\bar{1}$ 4 3)	$\bar{3}_r$
η_{10H}	$4_{[100]}^{+}$	(1 1 $\bar{1}$)	(1 4 $\bar{3}$)	$\bar{3}_q$

$$\Gamma_{A1\eta_{10}}^{\star}$$

$$\begin{pmatrix} \frac{5\sqrt{\frac{2}{13}} aAl}{3 a\eta} & -\frac{2\sqrt{\frac{2}{13}} aAl}{3 a\eta} & \frac{aAl}{\sqrt{3} c\eta} \\ -\frac{2\sqrt{\frac{2}{13}} aAl}{3 a\eta} & -\frac{7\sqrt{\frac{2}{13}} aAl}{3 a\eta} & -\frac{aAl}{\sqrt{3} c\eta} \\ \frac{7\sqrt{\frac{2}{13}} aAl}{3 a\eta} & \frac{5\sqrt{\frac{2}{13}} aAl}{3 a\eta} & -\frac{aAl}{\sqrt{3} c\eta} \end{pmatrix}$$

$$\Gamma_{A1\eta_{10}}$$

$$\begin{pmatrix} \frac{2\sqrt{\frac{2}{13}} a\eta}{aAl} & -\frac{3 a\eta}{\sqrt{26} aAl} & \frac{c\eta}{\sqrt{3} aAl} \\ \frac{a\eta}{\sqrt{26} aAl} & -\frac{2\sqrt{\frac{2}{13}} a\eta}{aAl} & -\frac{c\eta}{\sqrt{3} aAl} \\ \frac{3 a\eta}{\sqrt{26} aAl} & \frac{a\eta}{\sqrt{26} aAl} & -\frac{c\eta}{\sqrt{3} aAl} \end{pmatrix}$$

η_{11}

$$|h^{(1)}\rangle_\alpha = (001) ; |h^{(2)}\rangle_\alpha = (100)$$

η_{11}	v^β	$ h^{(1)}\rangle_\beta$	$ h^{(2)}\rangle_\beta$	H^β
η_{11A}	1	(1 1 0)	(1 $\bar{1}$ $\bar{1}$)	$2_{xy}/m_{xy}$
η_{11B}	$2_{[001]}$	($\bar{1}$ $\bar{1}$ 0)	($\bar{1}$ 1 $\bar{1}$)	$2_{xy}/m_{xy}$
η_{11C}	$2_{[010]}$	($\bar{1}$ 1 0)	($\bar{1}$ $\bar{1}$ 1)	$2_{x\bar{y}}/m_{x\bar{y}}$
η_{11D}	$2_{[100]}$	(1 $\bar{1}$ 0)	(1 1 1)	$2_{x\bar{y}}/m_{x\bar{y}}$
η_{11E}	$3_{[111]}^+$	(0 1 1)	($\bar{1}$ 1 $\bar{1}$)	$2_{yz}/m_{yz}$
η_{11F}	$3_{[\bar{1}\bar{1}\bar{1}]}^+$	(0 $\bar{1}$ $\bar{1}$)	($\bar{1}$ $\bar{1}$ 1)	$2_{yz}/m_{yz}$
η_{11G}	$3_{[\bar{1}\bar{1}1]}^+$	(0 $\bar{1}$ 1)	(1 $\bar{1}$ $\bar{1}$)	$2_{y\bar{z}}/m_{y\bar{z}}$
η_{11H}	$3_{[\bar{1}1\bar{1}]}^+$	(0 1 $\bar{1}$)	(1 1 1)	$2_{y\bar{z}}/m_{y\bar{z}}$
η_{11I}	$3_{[111]}^-$	(1 0 1)	($\bar{1}$ $\bar{1}$ 1)	$2_{z\bar{x}}/m_{z\bar{x}}$
η_{11J}	$3_{[\bar{1}\bar{1}\bar{1}]}^-$	($\bar{1}$ 0 $\bar{1}$)	(1 $\bar{1}$ $\bar{1}$)	$2_{z\bar{x}}/m_{z\bar{x}}$
η_{11K}	$3_{[\bar{1}1\bar{1}]}^-$	(1 0 $\bar{1}$)	($\bar{1}$ 1 $\bar{1}$)	$2_{z\bar{x}}/m_{z\bar{x}}$
η_{11L}	$3_{[11\bar{1}]}^-$	($\bar{1}$ 0 1)	(1 1 1)	$2_{z\bar{x}}/m_{z\bar{x}}$

$$\Gamma_{A1}^* \eta_{11}$$

$$\begin{pmatrix} \frac{2 aAl}{3 a\eta} & -\frac{(-2+\sqrt{6}) aAl}{6 a\eta} & \frac{aAl}{\sqrt{2} c\eta} \\ -\frac{2 aAl}{3 a\eta} & \frac{(-2+\sqrt{6}) aAl}{6 a\eta} & \frac{aAl}{\sqrt{2} c\eta} \\ -\frac{2 aAl}{3 a\eta} & -\frac{(1+\sqrt{6}) aAl}{3 a\eta} & 0 \end{pmatrix}$$

$$\Gamma_{A1} \eta_{11}$$

$$\begin{pmatrix} \frac{(6+\sqrt{6}) a\eta}{12 aAl} & -\frac{a\eta}{\sqrt{6} aAl} & \frac{c\eta}{\sqrt{2} aAl} \\ -\frac{(6+\sqrt{6}) a\eta}{12 aAl} & \frac{a\eta}{\sqrt{6} aAl} & \frac{c\eta}{\sqrt{2} aAl} \\ \frac{(-3+\sqrt{6}) a\eta}{6 aAl} & -\frac{\sqrt{\frac{2}{3}} a\eta}{aAl} & 0 \end{pmatrix}$$

η_{12}

$$|h^{(1)}\rangle_\alpha = (001) ; |h^{(2)}\rangle_\alpha = (110)$$

η_{12}	v^β	$ h^{(1)}\rangle_\beta$	$ h^{(2)}\rangle_\beta$	H^β
η_{12A}	1	(0 1 2)	(1 0 0)	$2_x/m_x$
η_{12B}	$2_{[010]}$	(0 1 $\bar{2}$)	($\bar{1}$ 0 0)	$2_x/m_x$
η_{12C}	$4_{[010]}^+$	(2 1 0)	(0 0 $\bar{1}$)	$2_z/m_z$
η_{12D}	$4_{[010]}^-$	($\bar{2}$ 1 0)	(0 0 1)	$2_z/m_z$
η_{12E}	$3_{[111]}^+$	(2 0 1)	(0 1 0)	$2_y/m_y$
η_{12F}	$3_{[1\bar{1}\bar{1}]}^+$	($\bar{2}$ 0 1)	(0 $\bar{1}$ 0)	$2_y/m_y$
η_{12G}	$2_{[011]}$	(0 2 1)	($\bar{1}$ 0 0)	$2_x/m_x$
η_{12H}	$4_{[100]}^+$	(0 $\bar{2}$ 1)	(1 0 0)	$2_x/m_x$
η_{12I}	$3_{[111]}^-$	(1 2 0)	(0 0 1)	$2_z/m_z$
η_{12J}	$3_{[1\bar{1}\bar{1}]}^-$	(1 $\bar{2}$ 0)	(0 0 $\bar{1}$)	$2_z/m_z$
η_{12K}	$4_{[001]}^-$	(1 0 2)	(0 $\bar{1}$ 0)	$2_y/m_y$
η_{12L}	$2_{[110]}$	(1 0 $\bar{2}$)	(0 1 0)	$2_y/m_y$

$$\Gamma_{A1}^* \eta_{12}$$

$$\begin{pmatrix} \frac{aAl}{a\eta} & \frac{aAl}{a\eta} & 0 \\ -\frac{2aAl}{\sqrt{15}a\eta} & \frac{2aAl}{\sqrt{15}a\eta} & \frac{aAl}{\sqrt{5}c\eta} \\ \frac{aAl}{\sqrt{15}a\eta} & -\frac{aAl}{\sqrt{15}a\eta} & \frac{2aAl}{\sqrt{5}c\eta} \end{pmatrix}$$

$$\Gamma_{A1} \eta_{12}$$

$$\begin{pmatrix} \frac{a\eta}{2aAl} & \frac{a\eta}{2aAl} & 0 \\ -\frac{\sqrt{\frac{3}{5}}a\eta}{aAl} & \frac{\sqrt{\frac{3}{5}}a\eta}{aAl} & \frac{c\eta}{\sqrt{5}aAl} \\ \frac{\sqrt{\frac{3}{5}}a\eta}{2aAl} & -\frac{\sqrt{\frac{3}{5}}a\eta}{2aAl} & \frac{2c\eta}{\sqrt{5}aAl} \end{pmatrix}$$