No. 216 $F\bar{4}3m$ T_d^2

$$\mathcal{G} = F\bar{4}3m$$

Orientation orbit (hkl)	Conventional basis of the scanning group $\mathbf{a}'$	$\mathbf{b}'$	$\mathbf{d}$	Scanning group $\mathcal{H}$	Linear orbit $s\mathbf{d}$	Sectional layer group $\mathcal{L}(s\mathbf{d})$	
(001)	$(\mathbf{a}-\mathbf{b})/2$	$(\mathbf{a}+\mathbf{b})/2$	$\mathbf{c}$	$I\bar{4}m2$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$	$p\bar{4}m2$	L59
(100)	$(\mathbf{b}-\mathbf{c})/2$	$(\mathbf{b}+\mathbf{c})/2$	$\mathbf{a}$		$[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$	$p\bar{4}m2$ ($\mathbf{a}'/2$ or $\mathbf{b}'/2$)	L59
(010)	$(\mathbf{c}-\mathbf{a})/2$	$(\mathbf{c}+\mathbf{a})/2$	$\mathbf{b}$		$[\pm s\mathbf{d}, (\pm s+\frac{1}{2})\mathbf{d}]$	$pmm2$	L23
(110)	$\mathbf{c}$	$(\mathbf{a}-\mathbf{b})/2$	$(\mathbf{a}+\mathbf{b})/2$	$I2mm$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$	$p2mm$	L27
$(1\bar{1}0)$	$\mathbf{c}$	$(\mathbf{a}+\mathbf{b})/2$	$(\mathbf{b}-\mathbf{a})/2$		$[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$	$p2_1mn$	L32
(011)	$\mathbf{a}$	$(\mathbf{b}-\mathbf{c})/2$	$(\mathbf{b}+\mathbf{c})/2$		$[\pm s\mathbf{d}, (\pm s+\frac{1}{2})\mathbf{d}]$	$p1m1$	L11
$(01\bar{1})$	$\mathbf{a}$	$(\mathbf{b}+\mathbf{c})/2$	$(\mathbf{c}-\mathbf{b})/2$				
(101)	$\mathbf{b}$	$(\mathbf{c}-\mathbf{a})/2$	$(\mathbf{c}+\mathbf{a})/2$				
$(\bar{1}01)$	$\mathbf{b}$	$(\mathbf{c}+\mathbf{a})/2$	$(\mathbf{a}-\mathbf{c})/2$				
(111)	$(\mathbf{a}-\mathbf{c})/2$	$(\mathbf{b}-\mathbf{a})/2$	$\boldsymbol{\tau}$	$R3m$	$[s\mathbf{d}, (s+\frac{1}{3})\mathbf{d}, (s+\frac{2}{3})\mathbf{d}]$	$p3m1$	L69
$(\bar{1}\bar{1}1)$	$(-\mathbf{a}-\mathbf{c})/2$	$(\mathbf{a}-\mathbf{b})/2$	$\boldsymbol{\tau}_3$				
$(1\bar{1}\bar{1})$	$(\mathbf{a}+\mathbf{c})/2$	$(-\mathbf{a}-\mathbf{b})/2$	$\boldsymbol{\tau}_1$				
$(\bar{1}1\bar{1})$	$(\mathbf{c}-\mathbf{a})/2$	$(\mathbf{a}+\mathbf{b})/2$	$\boldsymbol{\tau}_2$				

No. 217 $I\bar{4}3m$ T_d^3

$$\mathcal{G} = I\bar{4}3m$$

Orientation orbit (hkl)	Conventional basis of the scanning group $\mathbf{a}'$	$\mathbf{b}'$	$\mathbf{d}$	Scanning group $\mathcal{H}$	Linear orbit $s\mathbf{d}$	Sectional layer group $\mathcal{L}(s\mathbf{d})$	
(001)	$\mathbf{a}$	$\mathbf{b}$	$\mathbf{c}$	$I\bar{4}2m$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$	$p\bar{4}2m$	L57
(100)	$\mathbf{b}$	$\mathbf{c}$	$\mathbf{a}$		$[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$	$p\bar{4}2_1m$ ($\mathbf{a}'/2$ or $\mathbf{b}'/2$)	L58
(010)	$\mathbf{c}$	$\mathbf{a}$	$\mathbf{b}$		$[\pm s\mathbf{d}, (\pm s+\frac{1}{2})\mathbf{d}]$	$\widehat{c}mm2$	L26
(110)	$\mathbf{c}$	$\mathbf{a}-\mathbf{b}$	$\mathbf{a}+\mathbf{b}$	$F2mm$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$	$c2mm$	L35
$(1\bar{1}0)$	$\mathbf{c}$	$\mathbf{a}+\mathbf{b}$	$\mathbf{b}-\mathbf{a}$		$[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$	$c2me$ ($\mathbf{b}'/4$)	L36
(011)	$\mathbf{a}$	$\mathbf{b}-\mathbf{c}$	$\mathbf{b}+\mathbf{c}$		$[\pm s\mathbf{d}, (\pm s+\frac{1}{2})\mathbf{d}]$	$c1m1$	L13
$(01\bar{1})$	$\mathbf{a}$	$\mathbf{b}+\mathbf{c}$	$\mathbf{c}-\mathbf{b}$				
(101)	$\mathbf{b}$	$\mathbf{c}-\mathbf{a}$	$\mathbf{c}+\mathbf{a}$				
$(\bar{1}01)$	$\mathbf{b}$	$\mathbf{c}+\mathbf{a}$	$\mathbf{a}-\mathbf{c}$				
(111)	$\mathbf{a}-\mathbf{c}$	$\mathbf{b}-\mathbf{a}$	$\boldsymbol{\tau}/2$	$R3m$	$[s\mathbf{d}, (s+\frac{1}{3})\mathbf{d}, (s+\frac{2}{3})\mathbf{d}]$	$p3m1$	L69
$(\bar{1}\bar{1}1)$	$-\mathbf{a}-\mathbf{c}$	$\mathbf{a}-\mathbf{b}$	$\boldsymbol{\tau}_3/2$				
$(1\bar{1}\bar{1})$	$\mathbf{a}+\mathbf{c}$	$-\mathbf{a}-\mathbf{b}$	$\boldsymbol{\tau}_1/2$				
$(\bar{1}1\bar{1})$	$\mathbf{c}-\mathbf{a}$	$\mathbf{a}+\mathbf{b}$	$\boldsymbol{\tau}_2/2$				

Centring type *I*

Orientation orbit (hkl)	Conventional basis of the scanning group $\mathbf{a}'$	$\mathbf{b}'$	$\mathbf{d}$	Auxiliary basis of the scanning group $\widehat{\mathbf{a}}$	$\widehat{\mathbf{b}}$	$\widehat{\mathbf{c}}$
$(mn0)$	$\mathbf{c}$	$n\mathbf{a}-m\mathbf{b}$	$p\mathbf{a}+q\mathbf{b}$	$\mathbf{a}$	$\mathbf{b}$	$\mathbf{c}$
$(\overline{m}n0)$	$\mathbf{c}$	$n\mathbf{a}+m\mathbf{b}$	$-p\mathbf{a}+q\mathbf{b}$			
$(nm0)$	$\mathbf{c}$	$m\mathbf{a}-n\mathbf{b}$	$q\mathbf{a}+p\mathbf{b}$			
$(\overline{n}m0)$	$\mathbf{c}$	$m\mathbf{a}+n\mathbf{b}$	$-q\mathbf{a}+p\mathbf{b}$			
$(0mn)$	$\mathbf{a}$	$n\mathbf{b}-m\mathbf{c}$	$p\mathbf{b}+q\mathbf{c}$	$\mathbf{b}$	$\mathbf{c}$	$\mathbf{a}$
$(0\overline{m}n)$	$\mathbf{a}$	$n\mathbf{b}+m\mathbf{c}$	$-p\mathbf{b}+q\mathbf{c}$			
$(0nm)$	$\mathbf{a}$	$m\mathbf{b}-n\mathbf{c}$	$q\mathbf{b}+p\mathbf{c}$			
$(0\overline{n}m)$	$\mathbf{a}$	$m\mathbf{b}+n\mathbf{c}$	$-q\mathbf{b}+p\mathbf{c}$			
$(n0m)$	$\mathbf{b}$	$n\mathbf{c}-m\mathbf{a}$	$p\mathbf{c}+q\mathbf{a}$	$\mathbf{c}$	$\mathbf{a}$	$\mathbf{b}$
$(n0\overline{m})$	$\mathbf{b}$	$n\mathbf{c}+m\mathbf{a}$	$-p\mathbf{c}+q\mathbf{a}$			
$(m0n)$	$\mathbf{b}$	$m\mathbf{c}-n\mathbf{a}$	$q\mathbf{c}+p\mathbf{a}$			
$(m0\overline{n})$	$\mathbf{b}$	$m\mathbf{c}+n\mathbf{a}$	$-q\mathbf{c}+p\mathbf{a}$			
(hhl)	$\mathbf{a}-\mathbf{b}$	$n\widehat{\mathbf{a}}-m\mathbf{c}$	$p\widehat{\mathbf{a}}+q\mathbf{c}$	$(\mathbf{a}+\mathbf{b}+\mathbf{c})/2$	$\mathbf{c}$	$\mathbf{a}-\mathbf{b}$
$(\overline{h}\overline{h}l)$	$\mathbf{a}-\mathbf{b}$	$n\widehat{\mathbf{a}}+m\mathbf{c}$	$-p\widehat{\mathbf{a}}+q\mathbf{c}$			
$(h\overline{h}l)$	$\mathbf{a}+\mathbf{b}$	$n\widehat{\mathbf{a}}-m\mathbf{c}$	$p\widehat{\mathbf{a}}+q\mathbf{c}$	$(\mathbf{b}-\mathbf{a}+\mathbf{c})/2$	$\mathbf{c}$	$\mathbf{a}+\mathbf{b}$
$(\overline{h}hl)$	$\mathbf{a}+\mathbf{b}$	$n\widehat{\mathbf{a}}+m\mathbf{c}$	$-p\widehat{\mathbf{a}}+q\mathbf{c}$			
(lhh)	$\mathbf{b}-\mathbf{c}$	$n\widehat{\mathbf{a}}-m\mathbf{a}$	$p\widehat{\mathbf{a}}+q\mathbf{a}$	$(\mathbf{b}+\mathbf{c}+\mathbf{a})/2$	$\mathbf{a}$	$\mathbf{b}-\mathbf{c}$
$(l\overline{h}\overline{h})$	$\mathbf{b}-\mathbf{c}$	$n\widehat{\mathbf{a}}+m\mathbf{a}$	$-p\widehat{\mathbf{a}}+q\mathbf{a}$			
$(lh\overline{h})$	$\mathbf{b}+\mathbf{c}$	$n\widehat{\mathbf{a}}-m\mathbf{a}$	$p\widehat{\mathbf{a}}+q\mathbf{a}$	$(\mathbf{c}-\mathbf{b}+\mathbf{a})/2$	$\mathbf{a}$	$\mathbf{b}+\mathbf{c}$
$(l\overline{h}h)$	$\mathbf{b}+\mathbf{c}$	$n\widehat{\mathbf{a}}+m\mathbf{a}$	$-p\widehat{\mathbf{a}}+q\mathbf{a}$			
(hlh)	$\mathbf{c}-\mathbf{a}$	$n\widehat{\mathbf{a}}-m\mathbf{b}$	$p\widehat{\mathbf{a}}+q\mathbf{b}$	$(\mathbf{c}+\mathbf{a}+\mathbf{b})/2$	$\mathbf{b}$	$\mathbf{c}-\mathbf{a}$
$(\overline{h}l\overline{h})$	$\mathbf{c}-\mathbf{a}$	$n\widehat{\mathbf{a}}+m\mathbf{b}$	$-p\widehat{\mathbf{a}}+q\mathbf{b}$			
$(\overline{h}lh)$	$\mathbf{c}+\mathbf{a}$	$n\widehat{\mathbf{a}}-m\mathbf{b}$	$p\widehat{\mathbf{a}}+q\mathbf{b}$	$(\mathbf{a}-\mathbf{c}+\mathbf{b})/2$	$\mathbf{b}$	$\mathbf{c}+\mathbf{a}$
$(hl\overline{h})$	$\mathbf{c}+\mathbf{a}$	$n\widehat{\mathbf{a}}+m\mathbf{b}$	$-p\widehat{\mathbf{a}}+q\mathbf{b}$			
l odd $\Rightarrow n=2l, m=2h+l$; l even $\Rightarrow n=l, m=h+l/2$						

Arithmetic classes $432I$, $\bar{4}3mI$ and $m\bar{3}mI$

Serial No.	211	214	217	220	229	230
Group type	O^5	O^8	T_d^3	T_d^6	O_h^9	O_h^{10}
Group	$I432$	$I4_132$	$I\bar{4}3m$	$I\bar{4}3d$	$Im\bar{3}m$	$Ia\bar{3}d$
$(mn0)$ $(\bar{m}n0)$ $(nm0)$ $(\bar{n}m0)$	$I112$	$I112$ $(\mathbf{b}/4)$	$I112$	$I112$ $(\mathbf{b}/4)$	$I112/m$	$I112/b$
$(0mn)$ $(0\bar{m}n)$ $(0nm)$ $(0\bar{n}m)$		$I112$ $(\mathbf{c}/4)$		$I112$ $(\mathbf{c}/4)$		
$(n0m)$ $(n0\bar{m})$ $(m0n)$ $(m0\bar{n})$		$I112$ $(\mathbf{a}/4)$		$I112$ $(\mathbf{a}/4)$		
(hhl) $(\bar{h}hl)$	$B112$	$B112$ $(\mathbf{a}+\mathbf{c})/8$	$B11m$	$B11b$	$B112/m$	$B112/b$
$(h\bar{h}l)$ $(\bar{h}hl)$		$B112$ $3(\mathbf{a}+\mathbf{c})/8$				
(lhh) $(l\bar{h}h)$		$B112$ $(\mathbf{b}+\mathbf{a})/8$				
$(lh\bar{h})$ $(l\bar{h}h)$		$B112$ $3(\mathbf{b}+\mathbf{a})/8$				
(hlh) $(\bar{h}l\bar{h})$		$B112$ $(\mathbf{c}+\mathbf{b})/8$				
$(\bar{h}lh)$ $(hl\bar{h})$		$B112$ $3(\mathbf{c}+\mathbf{b})/8$				