Cubic　　　　　　　　　6. SCANNING TABLES　　　　　　　Laue class $O_h - m\bar{3}m$

No. 210　$F4_132$　　　　　　　　　　　　　　　　　　　　　　　　　　　$O^4$

$$\mathcal{G} = F4_132$$

| 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) | $(\mathbf{a}-\mathbf{b})/2$ | $(\mathbf{a}+\mathbf{b})/2$ | $\mathbf{c}$ | $I4_122$ | $[0\mathbf{d}, \frac{1}{2}\mathbf{d};$ | $\widehat{c}222$ | L22 |
| (100) | $(\mathbf{b}-\mathbf{c})/2$ | $(\mathbf{b}+\mathbf{c})/2$ | $\mathbf{a}$ | | $\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$ | $\widehat{c}222\ (\mathbf{a}'/2\ \text{or}\ \mathbf{b}'/2)$ | L22 |
| (010) | $(\mathbf{c}-\mathbf{a})/2$ | $(\mathbf{c}+\mathbf{a})/2$ | $\mathbf{b}$ | | $[\frac{1}{8}\mathbf{d}, \frac{5}{8}\mathbf{d};$ | $p22_12$ | L20 |
| | | | | | $\frac{3}{8}\mathbf{d}, \frac{7}{8}\mathbf{d}]$ | $p2_122$ | L20 |
| | | | | | $[\pm s\mathbf{d}, (\pm s + \frac{1}{4})\mathbf{d},$ | | |
| | | | | | $(\pm s + \frac{1}{2})\mathbf{d}, (\pm s + \frac{3}{4})\mathbf{d}]$ | $p112$ | L03 |
| (110) | $\mathbf{c}$ | $(\mathbf{a}-\mathbf{b})/2$ | $(\mathbf{a}+\mathbf{b})/2$ | $I2_12_12_1$ | $[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$ | $p22_12\ (3\mathbf{a}'/8+\mathbf{b}'/4)$ | L20 |
| (011) | $\mathbf{a}$ | $(\mathbf{b}-\mathbf{c})/2$ | $(\mathbf{b}+\mathbf{c})/2$ | $(3\mathbf{a}'/8+\mathbf{d}/4)$ | $[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$ | $p2_122\ (3\mathbf{a}'/8+\mathbf{b}'/4)$ | L20 |
| (101) | $\mathbf{b}$ | $(\mathbf{c}-\mathbf{a})/2$ | $(\mathbf{c}+\mathbf{a})/2$ | | $[\pm s\mathbf{d}, (\pm s + \frac{1}{2})\mathbf{d}]$ | $p112\ (3\mathbf{a}'/8+\mathbf{b}'/4)$ | L03 |
| $(1\bar{1}0)$ | $\mathbf{c}$ | $(\mathbf{a}+\mathbf{b})/2$ | $(\mathbf{b}-\mathbf{a})/2$ | $I2_12_12_1$ | $[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$ | $p22_12\ (\mathbf{a}'/8+\mathbf{b}'/4)$ | L20 |
| $(0\bar{1}1)$ | $\mathbf{a}$ | $(\mathbf{b}+\mathbf{c})/2$ | $(\mathbf{c}-\mathbf{b})/2$ | $(\mathbf{a}'/8+\mathbf{d}/4)$ | $[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$ | $p2_122\ (\mathbf{a}'/8+\mathbf{b}'/4)$ | L20 |
| $(\bar{1}01)$ | $\mathbf{b}$ | $(\mathbf{c}+\mathbf{a})/2$ | $(\mathbf{a}-\mathbf{c})/2$ | | $[\pm s\mathbf{d}, (\pm s + \frac{1}{2})\mathbf{d}]$ | $p112\ (\mathbf{a}'/8+\mathbf{b}'/4)$ | L03 |
| (111) | $(\mathbf{a}-\mathbf{c})/2$ | $(\mathbf{b}-\mathbf{a})/2$ | $\tau$ | $R32$ | $[\frac{1}{8}\mathbf{d},\quad [\frac{5}{8}\mathbf{d},$ | $p321$ | L68 |
| $(\bar{1}\bar{1}1)$ | $(-\mathbf{a}-\mathbf{c})/2$ | $(\mathbf{a}-\mathbf{b})/2$ | $\tau_3$ | $(\mathbf{d}/8)$ | $\frac{11}{24}\mathbf{d}, \parallel \frac{23}{24}\mathbf{d},$ | $p321\ [(2\mathbf{a}'+\mathbf{b}')/3]$ | L68 |
| $(1\bar{1}\bar{1})$ | $(\mathbf{a}+\mathbf{c})/2$ | $(-\mathbf{a}-\mathbf{b})/2$ | $\tau_1$ | | $\frac{19}{24}\mathbf{d}]\quad \frac{7}{24}\mathbf{d}]$ | $p321\ [(\mathbf{a}'+2\mathbf{b}')/3]$ | L68 |
| $(\bar{1}1\bar{1})$ | $(\mathbf{c}-\mathbf{a})/2$ | $(\mathbf{a}+\mathbf{b})/2$ | $\tau_2$ | | $[(\pm s + \frac{1}{8})\mathbf{d}, (\pm s + \frac{1}{3})\mathbf{d},$ | | |
| | | | | | $(\pm s + \frac{19}{24})\mathbf{d}]$ | $p3$ | L65 |

No. 211　$I432$　　　　　　　　　　　　　　　　　　　　　　　　　　　$O^5$

$$\mathcal{G} = I432$$

| 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) | $\mathbf{a}$ | $\mathbf{b}$ | $\mathbf{c}$ | $I422$ | $[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$ | $p422$ | L53 |
| (100) | $\mathbf{b}$ | $\mathbf{c}$ | $\mathbf{a}$ | | $[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$ | $p42_12$ | L54 |
| (010) | $\mathbf{c}$ | $\mathbf{a}$ | $\mathbf{b}$ | | $[\pm s\mathbf{d}, (\pm s + \frac{1}{2})\mathbf{d}]$ | $p4$ | L49 |
| (110) | $\mathbf{c}$ | $\mathbf{a}-\mathbf{b}$ | $\mathbf{a}+\mathbf{b}$ | $F222$ | $[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$ | $c222$ | L22 |
| $(1\bar{1}0)$ | $\mathbf{c}$ | $\mathbf{a}+\mathbf{b}$ | $\mathbf{b}-\mathbf{a}$ | | $[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$ | $c222\ [(\mathbf{a}'+\mathbf{b}')/4]$ | L22 |
| (011) | $\mathbf{a}$ | $\mathbf{b}-\mathbf{c}$ | $\mathbf{b}+\mathbf{c}$ | | $[\pm s\mathbf{d}, (\pm s + \frac{1}{2})\mathbf{d}]$ | $\widehat{p}112$ | L03 |
| $(0\bar{1}1)$ | $\mathbf{a}$ | $\mathbf{b}+\mathbf{c}$ | $\mathbf{c}-\mathbf{b}$ | | | | |
| (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) | $\mathbf{a}-\mathbf{c}$ | $\mathbf{b}-\mathbf{a}$ | $\tau/2$ | $R32$ | $[0\mathbf{d},\quad [\frac{1}{3}\mathbf{d},$ | $p321$ | L68 |
| $(\bar{1}\bar{1}1)$ | $-\mathbf{a}-\mathbf{c}$ | $\mathbf{a}-\mathbf{b}$ | $\tau_3/2$ | | $\frac{1}{3}\mathbf{d}, \parallel \frac{5}{6}\mathbf{d},$ | $p321\ [(2\mathbf{a}'+\mathbf{b}')/3]$ | L68 |
| $(1\bar{1}\bar{1})$ | $\mathbf{a}+\mathbf{c}$ | $-\mathbf{a}-\mathbf{b}$ | $\tau_1/2$ | | $\frac{2}{3}\mathbf{d}]\quad \frac{1}{6}\mathbf{d}]$ | $p321\ [(\mathbf{a}'+2\mathbf{b}')/3]$ | L68 |
| $(\bar{1}1\bar{1})$ | $\mathbf{c}-\mathbf{a}$ | $\mathbf{a}+\mathbf{b}$ | $\tau_2/2$ | | $[\pm s\mathbf{d}, (\pm s + \frac{1}{3})\mathbf{d}, (\pm s + \frac{2}{3})\mathbf{d}]$ | $p3$ | L65 |

## Centring type $F$

| Orientation orbit $(hkl)$ | Conventional basis of the scanning group | | | Auxiliary basis of the scanning group | | |
|---|---|---|---|---|---|---|
| | $\mathbf{a}'$ | $\mathbf{b}'$ | $\mathbf{d}$ | $\widehat{\mathbf{a}}$ | $\widehat{\mathbf{b}}$ | $\widehat{\mathbf{c}}$ |
| $(hk0)$ | $\mathbf{c}$ | $n\widehat{\mathbf{a}} - m\widehat{\mathbf{b}}$ | $p\widehat{\mathbf{a}} + q\widehat{\mathbf{b}}$ | $(\mathbf{a}-\mathbf{b})/2$ | $(\mathbf{a}+\mathbf{b})/2$ | $\mathbf{c}$ |
| $(\bar{h}k0)$ | $\mathbf{c}$ | $n\widehat{\mathbf{a}} + m\widehat{\mathbf{b}}$ | $-p\widehat{\mathbf{a}} + q\widehat{\mathbf{b}}$ | | | |
| $(kh0)$ | $\mathbf{c}$ | $m\widehat{\mathbf{a}} + n\mathbf{b}$ | $q\widehat{\mathbf{a}} + p\widehat{\mathbf{b}}$ | | | |
| $(\bar{k}h0)$ | $\mathbf{c}$ | $m\widehat{\mathbf{a}} - n\mathbf{b}$ | $-q\widehat{\mathbf{a}} + p\widehat{\mathbf{b}}$ | | | |
| $(0hk)$ | $\mathbf{a}$ | $n\widehat{\mathbf{a}} - m\widehat{\mathbf{b}}$ | $p\widehat{\mathbf{a}} + q\widehat{\mathbf{b}}$ | $(\mathbf{b}-\mathbf{c})/2$ | $(\mathbf{b}+\mathbf{c})/2$ | $\mathbf{a}$ |
| $(0\bar{h}k)$ | $\mathbf{a}$ | $n\widehat{\mathbf{a}} + m\widehat{\mathbf{b}}$ | $-p\widehat{\mathbf{a}} + q\widehat{\mathbf{b}}$ | | | |
| $(0kh)$ | $\mathbf{a}$ | $m\widehat{\mathbf{a}} - n\widehat{\mathbf{b}}$ | $q\widehat{\mathbf{a}} + p\widehat{\mathbf{b}}$ | | | |
| $(0\bar{k}h)$ | $\mathbf{a}$ | $m\widehat{\mathbf{a}} + n\widehat{\mathbf{b}}$ | $-q\widehat{\mathbf{a}} + p\widehat{\mathbf{b}}$ | | | |
| $(k0h)$ | $\mathbf{b}$ | $n\widehat{\mathbf{a}} - m\widehat{\mathbf{b}}$ | $p\widehat{\mathbf{a}} + q\widehat{\mathbf{b}}$ | $(\mathbf{c}-\mathbf{a})/2$ | $(\mathbf{c}+\mathbf{a})/2$ | $\mathbf{b}$ |
| $(k0\bar{h})$ | $\mathbf{b}$ | $n\widehat{\mathbf{a}} + m\widehat{\mathbf{b}}$ | $-p\widehat{\mathbf{a}} + q\widehat{\mathbf{b}}$ | | | |
| $(h0k)$ | $\mathbf{b}$ | $m\widehat{\mathbf{a}} - n\widehat{\mathbf{b}}$ | $q\widehat{\mathbf{a}} + p\widehat{\mathbf{b}}$ | | | |
| $(h0\bar{k})$ | $\mathbf{b}$ | $m\widehat{\mathbf{a}} + n\widehat{\mathbf{b}}$ | $-q\widehat{\mathbf{a}} + p\widehat{\mathbf{b}}$ | | | |
| $h$ even, $k$ odd or $h$ odd, $k$ even $\Rightarrow n = h+k,\ m = h-k$ <br> $h, k$ odd $\Rightarrow n = (h+k)/2,\ m = (h-k)/2$ | | | | | | |
| $(hhl)$ | $(\mathbf{a}-\mathbf{b})/2$ | $n\widehat{\mathbf{a}} - m\mathbf{c}$ | $p\widehat{\mathbf{a}} + q\mathbf{c}$ | $(\mathbf{a}+\mathbf{b})/2$ | $\mathbf{c}$ | $(\mathbf{a}-\mathbf{b})/2$ |
| $(\bar{h}hl)$ | $(\mathbf{a}-\mathbf{b})/2$ | $n\widehat{\mathbf{a}} + m\mathbf{c}$ | $-p\widehat{\mathbf{a}} + q\mathbf{c}$ | | | |
| $(hh\bar{l})$ | $(\mathbf{a}+\mathbf{b})/2$ | $n\widehat{\mathbf{a}} - m\mathbf{c}$ | $p\widehat{\mathbf{a}} + q\mathbf{c}$ | $(\mathbf{b}-\mathbf{a})/2$ | $\mathbf{c}$ | $(\mathbf{a}+\mathbf{b})/2$ |
| $(\bar{h}h\bar{l})$ | $(\mathbf{a}+\mathbf{b})/2$ | $n\widehat{\mathbf{a}} + m\mathbf{c}$ | $-p\widehat{\mathbf{a}} + q\mathbf{c}$ | | | |
| $(lhh)$ | $(\mathbf{b}-\mathbf{c})/2$ | $n\widehat{\mathbf{a}} - m\mathbf{a}$ | $p\widehat{\mathbf{a}} + q\mathbf{a}$ | $(\mathbf{b}+\mathbf{c})/2$ | $\mathbf{a}$ | $(\mathbf{b}-\mathbf{c})/2$ |
| $(\bar{l}hh)$ | $(\mathbf{b}-\mathbf{c})/2$ | $n\widehat{\mathbf{a}} + m\mathbf{a}$ | $-p\widehat{\mathbf{a}} + q\mathbf{a}$ | | | |
| $(lh\bar{h})$ | $(\mathbf{b}+\mathbf{c})/2$ | $n\widehat{\mathbf{a}} - m\mathbf{a}$ | $p\widehat{\mathbf{a}} + q\mathbf{a}$ | $(\mathbf{c}-\mathbf{b})/2$ | $\mathbf{a}$ | $(\mathbf{b}+\mathbf{c})/2$ |
| $(\bar{l}h\bar{h})$ | $(\mathbf{b}+\mathbf{c})/2$ | $n\widehat{\mathbf{a}} + m\mathbf{a}$ | $-p\widehat{\mathbf{a}} + q\mathbf{a}$ | | | |
| $(hlh)$ | $(\mathbf{c}-\mathbf{a})/2$ | $n\widehat{\mathbf{a}} - m\mathbf{b}$ | $p\widehat{\mathbf{a}} + q\mathbf{b}$ | $(\mathbf{c}+\mathbf{a})/2$ | $\mathbf{b}$ | $(\mathbf{c}-\mathbf{a})/2$ |
| $(\bar{h}l\bar{h})$ | $(\mathbf{c}-\mathbf{a})/2$ | $n\widehat{\mathbf{a}} + m\mathbf{b}$ | $-p\widehat{\mathbf{a}} + q\mathbf{b}$ | | | |
| $(\bar{h}lh)$ | $(\mathbf{c}+\mathbf{a})/2$ | $n\widehat{\mathbf{a}} - m\mathbf{b}$ | $p\widehat{\mathbf{a}} + q\mathbf{b}$ | $(\mathbf{a}-\mathbf{c})/2$ | $\mathbf{b}$ | $(\mathbf{c}+\mathbf{a})/2$ |
| $(hl\bar{h})$ | $(\mathbf{c}+\mathbf{a})/2$ | $n\widehat{\mathbf{a}} + m\mathbf{b}$ | $-p\widehat{\mathbf{a}} + q\mathbf{b}$ | | | |
| $h$ odd $\Rightarrow m = h, n = 2l$; $h$ even $\Rightarrow m = h/2, n = l$ | | | | | | |

Arithmetic classes $432F$ and $\overline{4}3mF$

| Serial No. | 209 | 210 | 216 | 219 |
|---|---|---|---|---|
| Group type | $O^3$ | $O^4$ | $T_d^2$ | $T_d^5$ |
| Group | $F432$ | $F4_132$ | $F\overline{4}3m$ | $F\overline{4}3c$ |
| $(hk0)$ | $I112$ | $I112$ | $I112$ | $I112$ |
| $(\overline{h}k0)$ | | | | |
| $(kh0)$ | | | | |
| $(\overline{k}h0)$ | | | | |
| $(0hk)$ | | | | |
| $(0\overline{h}k)$ | | | | |
| $(0kh)$ | | | | |
| $(0\overline{k}h)$ | | | | |
| $(k0h)$ | | | | |
| $(k0\overline{h})$ | | | | |
| $(h0k)$ | | | | |
| $(h0\overline{k})$ | | | | |
| $(hhl)$ | $I112$ | $I112$ | $I11m$ | $I11a$ |
| $(\overline{h}\overline{h}l)$ | | $(\mathbf{a}/4 + \mathbf{c}/8)$ | | |
| $(h\overline{h}l)$ | | $I112$ | | $I11b$ |
| $(\overline{h}hl)$ | | $(\mathbf{a}/4 + 3\mathbf{c}/8)$ | | |
| $(lhh)$ | | $I112$ | | $I11a$ |
| $(l\overline{h}\overline{h})$ | | $(\mathbf{b}/4 + \mathbf{a}/8)$ | | |
| $(lh\overline{h})$ | | $I112$ | | $I11b$ |
| $(l\overline{h}h)$ | | $(\mathbf{b}/4 + 3\mathbf{a}/8)$ | | |
| $(hlh)$ | | $I112$ | | $I11a$ |
| $(\overline{h}l\overline{h})$ | | $(\mathbf{c}/4 + \mathbf{b}/8)$ | | |
| $(\overline{h}lh)$ | | $I112$ | | $I11b$ |
| $(hl\overline{h})$ | | $(\mathbf{c}/4 + 3\mathbf{b}/8)$ | | |