

$P2_1/m$

C_{2h}^2

$2/m$

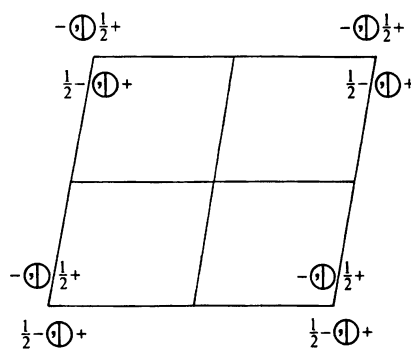
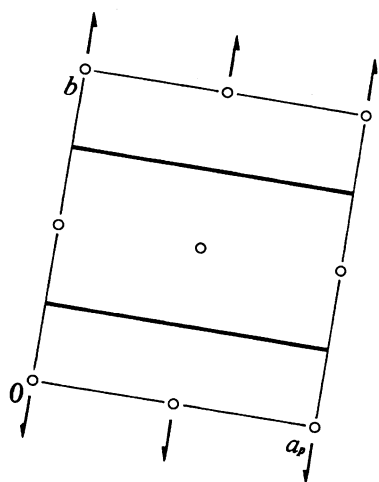
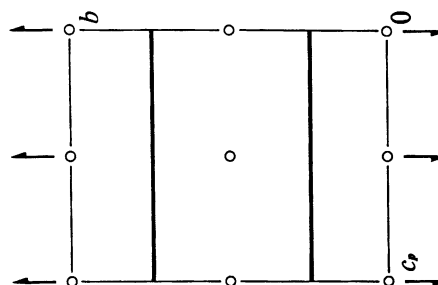
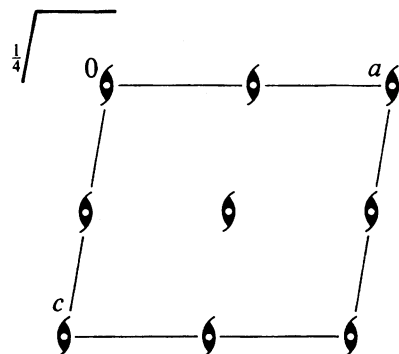
Monoclinic

No. 11

$P12_1/m1$

Patterson symmetry $P12/m1$

UNIQUE AXIS b



Origin at $\bar{1}$ on 2_1

Asymmetric unit $0 \leq x \leq 1; 0 \leq y \leq \frac{1}{4}; 0 \leq z \leq 1$

Symmetry operations

- (1) 1 (2) $2(0, \frac{1}{2}, 0) \ 0, y, 0$ (3) $\bar{1} \ 0, 0, 0$ (4) $m \ x, \frac{1}{4}, z$

Generators selected (1); $t(1,0,0)$; $t(0,1,0)$; $t(0,0,1)$; (2); (3)

Positions

Multiplicity, Wyckoff letter, Site symmetry	Coordinates				Reflection conditions
4 <i>f</i> 1	(1) x, y, z	(2) $\bar{x}, y + \frac{1}{2}, \bar{z}$	(3) $\bar{x}, \bar{y}, \bar{z}$	(4) $x, \bar{y} + \frac{1}{2}, z$	General: $0k0 : k = 2n$ Special: as above, plus no extra conditions
2 <i>e</i> m	$x, \frac{1}{4}, z$	$\bar{x}, \frac{3}{4}, \bar{z}$			$hkl : k = 2n$
2 <i>d</i> $\bar{1}$	$\frac{1}{2}, 0, \frac{1}{2}$	$\frac{1}{2}, \frac{1}{2}, \frac{1}{2}$			$hkl : k = 2n$
2 <i>c</i> $\bar{1}$	$0, 0, \frac{1}{2}$	$0, \frac{1}{2}, \frac{1}{2}$			$hkl : k = 2n$
2 <i>b</i> $\bar{1}$	$\frac{1}{2}, 0, 0$	$\frac{1}{2}, \frac{1}{2}, 0$			$hkl : k = 2n$
2 <i>a</i> $\bar{1}$	$0, 0, 0$	$0, \frac{1}{2}, 0$			$hkl : k = 2n$

Symmetry of special projections

Along [001] $p2gm$
 $\mathbf{a}' = \mathbf{a}_p$ $\mathbf{b}' = \mathbf{b}$
Origin at $0, 0, z$

Along [100] $p2mg$
 $\mathbf{a}' = \mathbf{b}$ $\mathbf{b}' = \mathbf{c}_p$
Origin at $x, 0, 0$

Along [010] $p2$
 $\mathbf{a}' = \mathbf{c}$ $\mathbf{b}' = \mathbf{a}$
Origin at $0, y, 0$

Maximal non-isomorphic subgroups

I [2] $P1m1 (Pm, 6)$ 1; 4
[2] $P12_11 (P2_1, 4)$ 1; 2
[2] $P\bar{1} (2)$ 1; 3

IIa none

IIb [2] $P12_1/c1 (\mathbf{c}' = 2\mathbf{c}) (P2_1/c, 14)$; [2] $P12_1/a1 (\mathbf{a}' = 2\mathbf{a}) (P2_1/c, 14)$; [2] $B12_1/e1 (\mathbf{a}' = 2\mathbf{a}, \mathbf{c}' = 2\mathbf{c}) (P2_1/c, 14)$

Maximal isomorphic subgroups of lowest index

IIc [2] $P12_1/m1 (\mathbf{c}' = 2\mathbf{c}$ or $\mathbf{a}' = 2\mathbf{a}$ or $\mathbf{a}' = \mathbf{a} + \mathbf{c}, \mathbf{c}' = -\mathbf{a} + \mathbf{c}) (P2_1/m, 11)$; [3] $P12_1/m1 (\mathbf{b}' = 3\mathbf{b}) (P2_1/m, 11)$

Minimal non-isomorphic supergroups

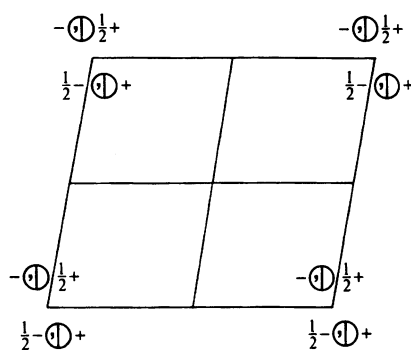
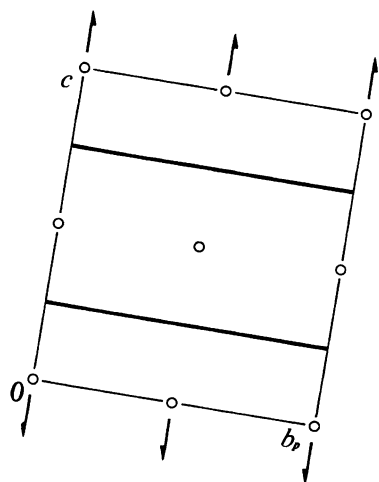
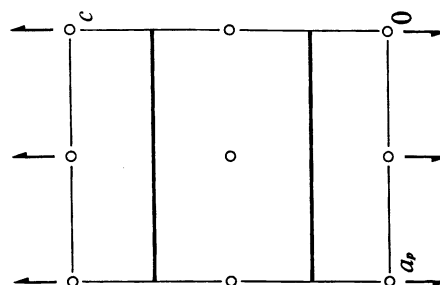
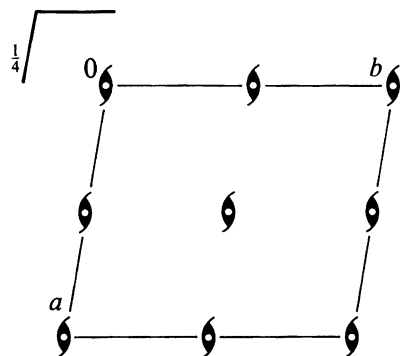
I [2] $Pmma (51)$; [2] $Pbcm (57)$; [2] $Pmnn (59)$; [2] $Pnma (62)$; [2] $Cmcm (63)$; [3] $P6_3/m (176)$

II [2] $C12/m1 (C2/m, 12)$; [2] $A12/m1 (C2/m, 12)$; [2] $I12/m1 (C2/m, 12)$; [2] $P12/m1 (\mathbf{b}' = \frac{1}{2}\mathbf{b}) (P2/m, 10)$

$P2_1/m$ C_{2h}^2 $2/m$

Monoclinic

No. 11

 $P112_1/m$ Patterson symmetry $P112/m$ UNIQUE AXIS c **Origin** at $\bar{1}$ on 2_1 **Asymmetric unit** $0 \leq x \leq 1; 0 \leq y \leq 1; 0 \leq z \leq \frac{1}{4}$ **Symmetry operations**

- (1) 1 (2) $2(0, 0, \frac{1}{2})$ $0, 0, z$ (3) $\bar{1}$ $0, 0, 0$ (4) m $x, y, \frac{1}{4}$

Generators selected (1); $t(1,0,0)$; $t(0,1,0)$; $t(0,0,1)$; (2); (3)

Positions

Multiplicity, Wyckoff letter, Site symmetry	Coordinates				Reflection conditions
4 <i>f</i> 1	(1) x, y, z	(2) $\bar{x}, \bar{y}, z + \frac{1}{2}$	(3) $\bar{x}, \bar{y}, \bar{z}$	(4) $x, y, \bar{z} + \frac{1}{2}$	General: $00l : l = 2n$ Special: as above, plus no extra conditions
2 <i>e</i> m	$x, y, \frac{1}{4}$	$\bar{x}, \bar{y}, \frac{3}{4}$			$hkl : l = 2n$
2 <i>d</i> $\bar{1}$	$\frac{1}{2}, \frac{1}{2}, 0$	$\frac{1}{2}, \frac{1}{2}, \frac{1}{2}$			$hkl : l = 2n$
2 <i>c</i> $\bar{1}$	$\frac{1}{2}, 0, 0$	$\frac{1}{2}, 0, \frac{1}{2}$			$hkl : l = 2n$
2 <i>b</i> $\bar{1}$	$0, \frac{1}{2}, 0$	$0, \frac{1}{2}, \frac{1}{2}$			$hkl : l = 2n$
2 <i>a</i> $\bar{1}$	$0, 0, 0$	$0, 0, \frac{1}{2}$			$hkl : l = 2n$

Symmetry of special projections

Along $[001] p2$
 $\mathbf{a}' = \mathbf{a}$ $\mathbf{b}' = \mathbf{b}$
Origin at $0, 0, z$

Along $[100] p2gm$
 $\mathbf{a}' = \mathbf{b}'_p$ $\mathbf{b}' = \mathbf{c}$
Origin at $x, 0, 0$

Along $[010] p2mg$
 $\mathbf{a}' = \mathbf{c}$ $\mathbf{b}' = \mathbf{a}'_p$
Origin at $0, y, 0$

Maximal non-isomorphic subgroups

I $[2] P11m (Pm, 6)$ 1; 4
 $[2] P112_1 (P2_1, 4)$ 1; 2
 $[2] P\bar{1} (2)$ 1; 3

IIa none

IIb $[2] P112_1/a (\mathbf{a}' = 2\mathbf{a}) (P2_1/c, 14)$; $[2] P112_1/b (\mathbf{b}' = 2\mathbf{b}) (P2_1/c, 14)$; $[2] C112_1/e (\mathbf{a}' = 2\mathbf{a}, \mathbf{b}' = 2\mathbf{b}) (P2_1/c, 14)$

Maximal isomorphic subgroups of lowest index

IIc $[2] P112_1/m (\mathbf{a}' = 2\mathbf{a}$ or $\mathbf{b}' = 2\mathbf{b}$ or $\mathbf{a}' = \mathbf{a} - \mathbf{b}, \mathbf{b}' = \mathbf{a} + \mathbf{b}) (P2_1/m, 11)$; $[3] P112_1/m (\mathbf{c}' = 3\mathbf{c}) (P2_1/m, 11)$

Minimal non-isomorphic supergroups

I $[2] Pmma (51)$; $[2] Pbcm (57)$; $[2] Pmnm (59)$; $[2] Pnma (62)$; $[2] Cmc (63)$; $[3] P6_3/m (176)$

II $[2] A112/m (C2/m, 12)$; $[2] B112/m (C2/m, 12)$; $[2] I112/m (C2/m, 12)$; $[2] P112/m (\mathbf{c}' = \frac{1}{2}\mathbf{c}) (P2/m, 10)$