

$I2_12_12_1$

D_2^9

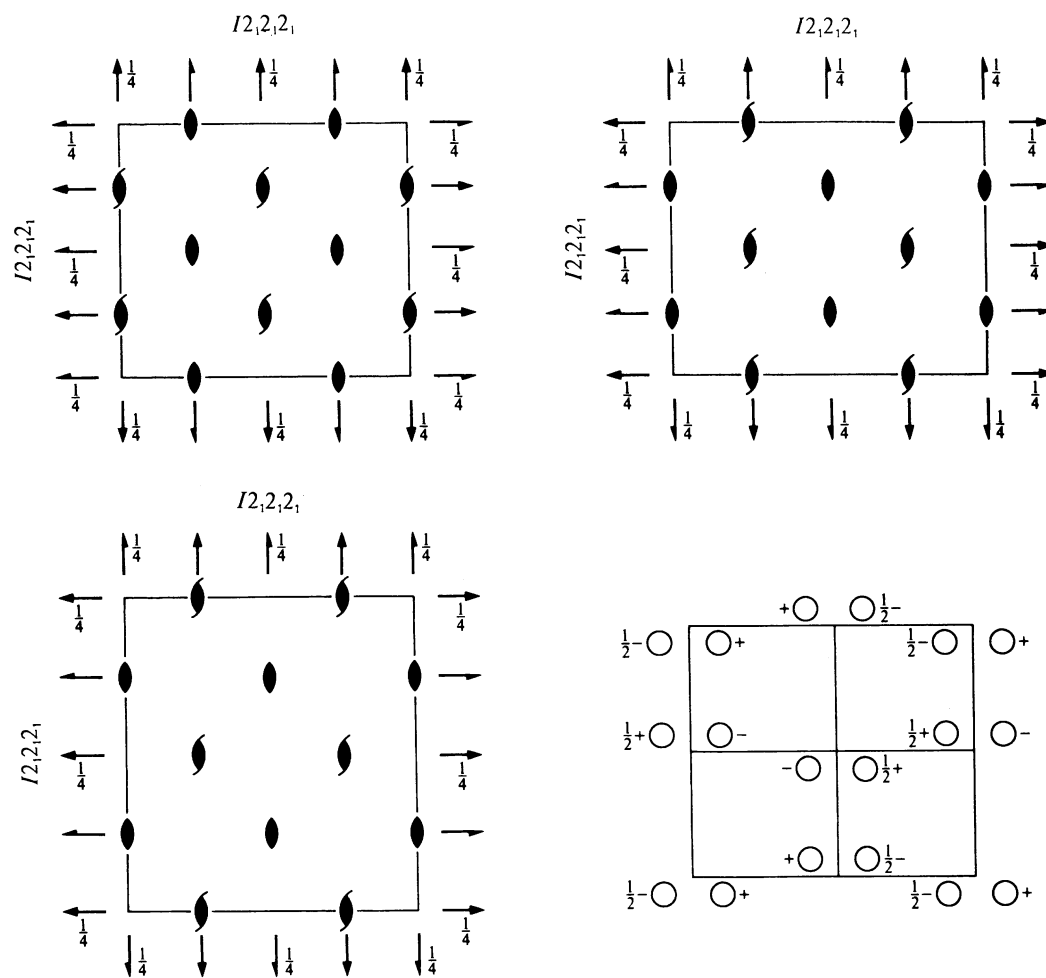
222

Orthorhombic

No. 24

$I2_12_12_1$

Patterson symmetry $Immm$



Origin at midpoint of three non-intersecting pairs of parallel 2 axes

Asymmetric unit $0 \leq x \leq \frac{1}{2}; 0 \leq y \leq \frac{1}{2}; 0 \leq z \leq \frac{1}{2}$

Symmetry operations

For $(0,0,0)+$ set

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

For $(\frac{1}{2},\frac{1}{2},\frac{1}{2})+$ set

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

Generators selected (1); $t(1,0,0)$; $t(0,1,0)$; $t(0,0,1)$; $t(\frac{1}{2}, \frac{1}{2}, \frac{1}{2})$; (2); (3)

Positions

Multiplicity, Wyckoff letter, Site symmetry	Coordinates	Reflection conditions
	$(0,0,0) + (\frac{1}{2}, \frac{1}{2}, \frac{1}{2}) +$	General:
8 <i>d</i> 1	(1) x, y, z (2) $\bar{x} + \frac{1}{2}, \bar{y}, z + \frac{1}{2}$ (3) $\bar{x}, y + \frac{1}{2}, \bar{z} + \frac{1}{2}$ (4) $x + \frac{1}{2}, \bar{y} + \frac{1}{2}, \bar{z}$	$hkl : h + k + l = 2n$ $0kl : k + l = 2n$ $h0l : h + l = 2n$ $hk0 : h + k = 2n$ $h00 : h = 2n$ $0k0 : k = 2n$ $00l : l = 2n$
4 <i>c</i> ..2	$0, \frac{1}{4}, z$ $0, \frac{3}{4}, \bar{z} + \frac{1}{2}$	Special: as above, plus $hk0 : h = 2n$
4 <i>b</i> .2.	$\frac{1}{4}, y, 0$ $\frac{1}{4}, \bar{y}, \frac{1}{2}$	$h0l : h = 2n$
4 <i>a</i> 2..	$x, 0, \frac{1}{4}$ $\bar{x} + \frac{1}{2}, 0, \frac{3}{4}$	$0kl : k = 2n$

Symmetry of special projections

Along [001] $c2mm$
 $\mathbf{a}' = \mathbf{a}$ $\mathbf{b}' = \mathbf{b}$
Origin at $\frac{1}{4}, 0, z$

Along [100] $c2mm$
 $\mathbf{a}' = \mathbf{b}$ $\mathbf{b}' = \mathbf{c}$
Origin at $x, \frac{1}{4}, 0$

Along [010] $c2mm$
 $\mathbf{a}' = \mathbf{c}$ $\mathbf{b}' = \mathbf{a}$
Origin at $0, y, \frac{1}{4}$

Maximal non-isomorphic subgroups

I	[2] $I112_1$ ($C2, 5$) (1; 2)+ [2] $I12_11$ ($C2, 5$) (1; 3)+ [2] $I2_111$ ($C2, 5$) (1; 4)+
IIa	[2] $P2_12_12_1$ (19) 1; 2; 3; 4 [2] $P222_1$ (17) 1; 2; (3; 4) + $(\frac{1}{2}, \frac{1}{2}, \frac{1}{2})$ [2] $P22_12$ ($P222_1, 17$) 1; 3; (2; 4) + $(\frac{1}{2}, \frac{1}{2}, \frac{1}{2})$ [2] $P2_122$ ($P222_1, 17$) 1; 4; (2; 3) + $(\frac{1}{2}, \frac{1}{2}, \frac{1}{2})$
IIb	none

Maximal isomorphic subgroups of lowest index

IIc [3] $I2_12_12_1$ ($\mathbf{a}' = 3\mathbf{a}$ or $\mathbf{b}' = 3\mathbf{b}$ or $\mathbf{c}' = 3\mathbf{c}$) (24)

Minimal non-isomorphic supergroups

I	[2] $Ibca$ (73); [2] $Imma$ (74); [2] $I4_122$ (98); [2] $I\bar{4}2d$ (122); [3] $I2_13$ (199)
II	[2] $A222$ ($\mathbf{a}' = \frac{1}{2}\mathbf{a}$) ($C222, 21$); [2] $B222$ ($\mathbf{b}' = \frac{1}{2}\mathbf{b}$) ($C222, 21$); [2] $C222$ ($\mathbf{c}' = \frac{1}{2}\mathbf{c}$) (21)