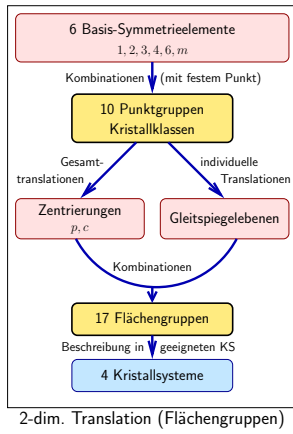
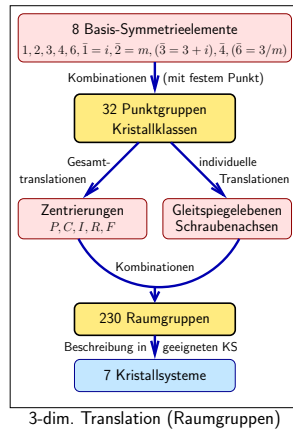


3.2. Flächengruppen (Forts.)



2-dim. Translation (Flächengruppen)



3-dim. Translation (Raumgruppen)

Tabelle der Flächengruppen

Punktgruppe	Flächengruppen	Koordinatensystem
1	<i>p1</i>	schiefwinklig
2	<i>p2</i>	( $a \neq b; \gamma$ beliebig)
1 <i>m</i> 1	<i>pm, pg, cm</i>	rechtwinklig
2 <i>mm</i>	<i>pmm2, pmg2, pgg2, cmm2</i>	( $a \neq b; \gamma = 90^\circ$ )
411	<i>p4</i>	quadratisch
4 <i>mm</i>	<i>p4mm, p4gm</i>	( $a = b; \gamma = 90^\circ$ )
311	<i>p3</i>	hexagonal
3 <i>m</i> 1	<i>p3m1, p31m</i>	( $a = b; \gamma = 120^\circ$ )
611	<i>p6</i>	
6 <i>mm</i>	<i>p6mm</i>	

Beispiele Flächengruppen

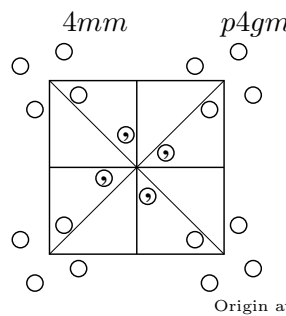
Flächengruppe *pg*



Flächengruppe *p4gm*

Auszug aus den *International Tables*

Square



Origin at 4

No. 12

*p4g*

Number of positions, Wyckoff notation, and point symmetry

8 *d*

1  $x, y, z, \bar{x}, \frac{1}{2} - x, \frac{1}{2} + y, \frac{1}{2} - y, \frac{1}{2} - x; \bar{x}, y, \bar{y}, x, \frac{1}{2} + y, \frac{1}{2} - y; \frac{1}{2} + y, \frac{1}{2} - x.$

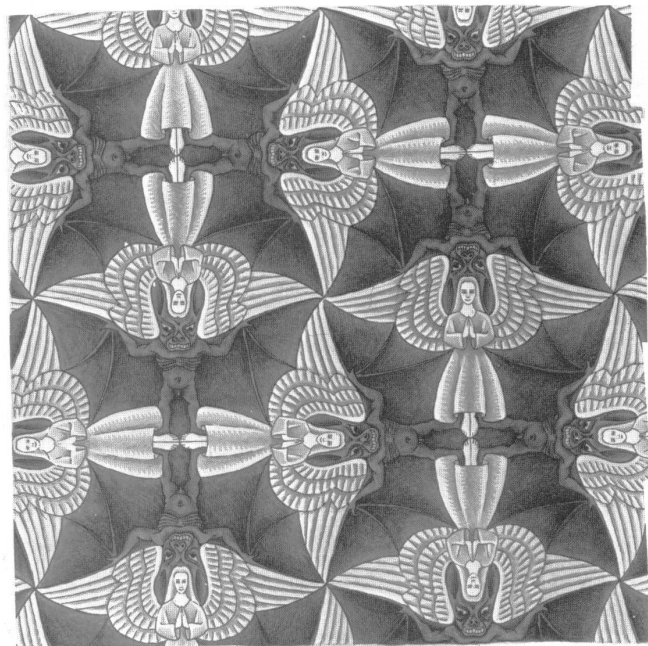
Conditions limiting possible reflections

General:  
hk: No conditions  
 $h0: h = 2n$  ( $0k: k = 2n$ )  
hh: No conditions

4 *c*  
2 *b*  
2 *a*

*m*  $x, \frac{1}{2} + x; \bar{x}, \frac{1}{2} - x; \frac{1}{2} + x, \bar{x}; \frac{1}{2} - x, x;$   
*mm*  $\frac{1}{2}, 0; 0, \frac{1}{2}$   
4  $0, 0; \frac{1}{2}, \frac{1}{2}$

Special: as above, plus no extra conditions  
 $hk: h + k = 2n$   
 $hk: h + k = 2n$



Beispiel *p4gm*

M.C. Escher: "Engel und Teufel" (1941)