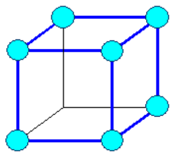
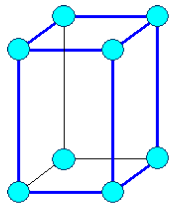
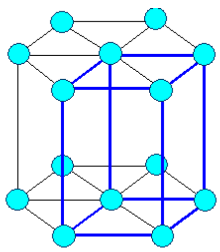
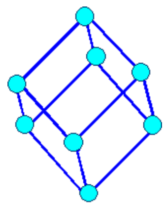
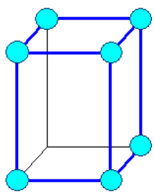
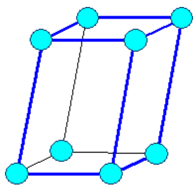
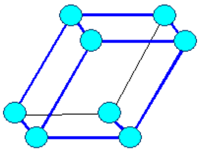
Ebenenabstand in nichtkubischen Gittersystemen

Advanced

Die Abstände zwischen benachbarten Ebenen mit denselben **Miller-Indices** berechnen sich wie folgt:

Name des Kristallsystems Länge der Basisvektoren	Zugehöriges unzentriertes Bravaisgitter (gelegentlich nur "sichtbare" Gitterpunkte eingezeichnet)	Achsenwinkel	Abstand zweier Ebenen mit Miller-Indices (hkl)
Kubisch $a_1 = a_2 = a_3$	 kubisch-primitiv	$\alpha = \beta = \gamma = 90^0$	$d_{hkl} = \frac{a}{(h^2 + k^2 + l^2)^{1/2}}$
Tetragonal $a_1 = a_2 \neq a_3$ $a_3 = c$	 Tetragonal-primitiv	$\alpha = \beta = \gamma = 90^0$	$d_{hkl} = \frac{a}{(h^2 + k^2 + a^2/c^2 \cdot l^2)^{1/2}}$
Hexagonal $a_1 = a_2 \neq a_3$	 Hexagonal (EZ ergänzt um hex. Symmetrie zu zeigen)	$\alpha = \beta = 90^0, \gamma = 120^0$	$d_{hkl} = \frac{a}{\{4/3(h^2 + hk + k^2) + a^2/c^2 \cdot l^2\}^{1/2}}$
Rhomboedrisch $a_1 = a_2 = a_3$	 Rhomboedrisch	$\alpha = \beta = \gamma \neq 90^0$	$\frac{1}{d^2} = \frac{(h^2 + l^2 + k^2)\sin^2\alpha + 2(hk + kl + hl)(\cos^2\alpha - \cos\alpha)}{a^2(1 - 3\cos^2\alpha + 2\cos^3\alpha)}$
Orthorhombisch $a_1 \neq a_2 \neq a_3$	 Orthorhombisch-primitiv	$\alpha = \beta = \gamma \neq 90^0$	$d_{hkl} = \frac{1}{\{(h/a)^2 + (k/b)^2 + (l/c)^2\}^{1/2}}$
Monoklin $a_1 \neq a_2 \neq a_3$	 Monoklin-primitiv	$\alpha = \beta = 90^0, \gamma \neq 90^0$	$\frac{1}{d^2} = \frac{h^2}{a^2\sin^2\beta} + k^2b^2 + \frac{l^2}{c^2\sin^2\beta} - \frac{2hl\cos\beta}{ac\sin^2\beta}$

Triklin $a_1 \neq a_2 \neq a_3$		$\alpha \neq \beta \neq \gamma \neq 90^0$ **Volumen EZ** $V = abc \cdot (1 - \cos^2\alpha - \cos^2\beta - \cos^2\gamma$ $+ 2\cos\alpha \cdot \cos\beta \cdot \cos\gamma)^{1/2}$ **Parameter** $S_{11} = b^2c^2\sin^2\alpha$ $S_{22} = a^2c^2\sin^2\beta$ $S_{33} = a^2b^2\sin^2\gamma$ $S_{12} = abc^2 (\cos\alpha \cdot \cos\beta - \cos\gamma)$ $S_{23} = a^2bc (\cos\beta \cdot \cos\gamma - \cos\alpha)$ $S_{13} = ab^2c (\cos\gamma \cdot \cos\alpha - \cos\beta)$ **Abstand** $\frac{1}{d^2} = \frac{1}{V^2} \cdot (S_{11}h^2 + S_{22}k^2 + S_{33}l^2$ $+ 2S_{12}hk + 2S_{23}kl + 2S_{13}hl)$