International Tables for Crystallography (2010). Vol. B, Figure 2.5.3.26, p. 353.

Table 2.5.3.14. *Diffraction groups and CBED symmetries for two icosahedral point groups*

Point group	Diffraction group	BP	WP	DP	±DP
235	$5m_R$	$5m$	5	1	1
					m_R
				m_2	1
	(Projection) $5m1_R$	$10mm$	$5m$	$2 = 1_R$	1
					m_v1_R
				$2m_vm_2$	1
$m\bar{3}\bar{5}$	10_Rmm_R	$10mm$	$5m$	1	2_R
				m_2	2_Rm_2
				m_v	2_Rm_v
	(Projection) $10mm1_R$	$10mm$	$10mm$	2	21_R
				$2m_vm_2$	21_Rm_v

dimensions (*e.g.* Jarić, 1988). A quasicrystal is produced by the intersection of the six-dimensional crystal with an embedded three-dimensional hyperplane (the cut-and-projection technique).

Addition of several per cent of silicon to Al–Mn alloys caused a great increase in the degree of order of the quasicrystal. Bendersky & Kaufman (1986) prepared such a less-strained quasicrystalline $Al_{71}Mn_{23}Si_6$ alloy and determined its point group. They obtained fairly good zone-axis CBED patterns that showed symmetries of $10mm$, $6mm$ and $2mm$ in the ZOLZ discs and $5m$, $3m$ and $2mm$ in HOLZ rings. From these results, they identified the point group to be centrosymmetric $m\bar{3}\bar{5}$. Figs. 2.5.3.24(*a*)–(*f*) show three pairs of CBED patterns taken from an area about 100 nm thick and about 3 nm in diameter of an $Al_{74}Mn_{20}Si_6$ quasicrystal at an accelerating voltage of 60 kV (Tanaka, Terauchi & Sekii, 1987). This quasicrystal was found to have much better ordering than $Al_{71}Mn_{23}Si_6$. The fact that Kikuchi bands are clearly seen in the HOLZ patterns and the profiles of the bands are symmetric with respect to their centre indicates (Figs. 2.5.3.24*b*, *d* and *f*) that the quasicrystal has sufficiently good quality or highly ordered atomic arrangements to perform reliable symmetry determination. Each pair of CBED patterns consists of a ZOLZ pattern and a HOLZ pattern. The former is produced solely by the interaction of ZOLZ reflections, showing distinct symmetries in several discs.

The whole pattern of Fig. 2.5.3.24(*a*), formed by ZOLZ reflections, exhibits a tenfold rotation symmetry and two types of mirror symmetry, the resultant symmetry being expressed as

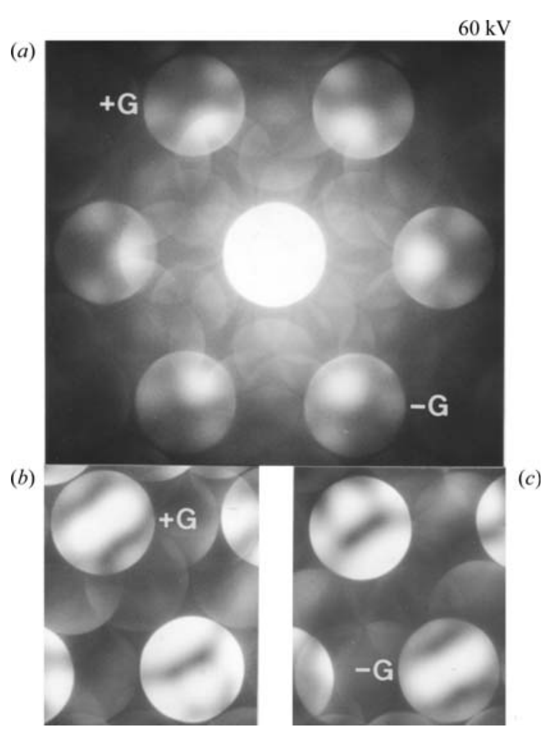

Fig. 2.5.3.25. CBED patterns of $Al_{74}Mn_{20}Si_6$ taken with an electron incidence along the threefold axis. (*a*) Zone-axis pattern showing symmetry $3m$. (*b*,*c*) ±DP showing translational symmetry or 2_R, indicating that the quasicrystal is centrosymmetric.

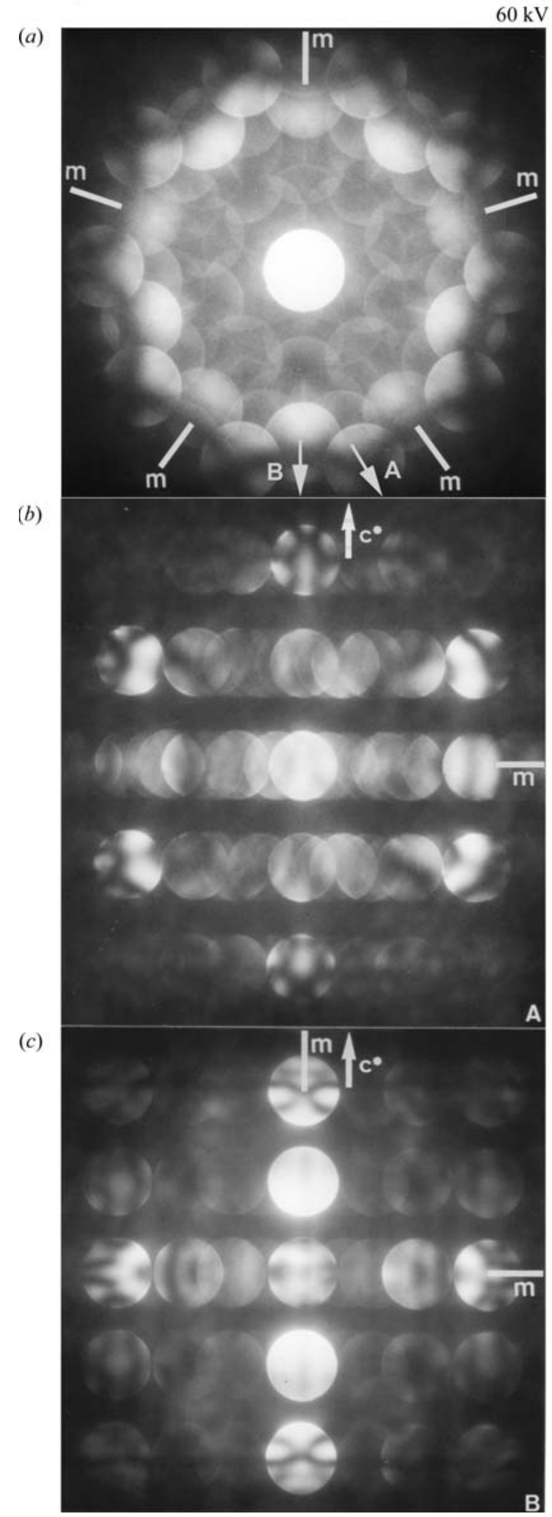

Fig. 2.5.3.26. CBED patterns of metastable $Al_{70}Ni_{15}Fe_{15}$ taken from a 3 nm diameter area. (*a*) Electron incidence along the decagonal axis: symmetry $5m$. (*b*) Electron incidence along direction A indicated in (*a*): symmetry m perpendicular to the decagonal axis. (*c*) Electron incidence along direction B indicated in (*a*): symmetry $2mm$. This alloy is found to be noncentrosymmetric.