

Response to K. H. Kuo's *Comments on quasicrystalline phases and examples of quasicrystalline phase nomenclature in Nomenclature of magnetic, incommensurate, composition-changed morphotropic, polytype, transient-structural and quasicrystalline phases undergoing phase transitions. II. Report of an IUCr Working Group on Phase Transition Nomenclature by J.-C. Tolédano et al. (2001). Acta Cryst. A57, 614–626*

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Three statements concerning quasicrystalline phases in §7.5 of Report II by an IUCr Working Group on Phase Transition Nomenclature (Tolédano *et al.*, 2001) are commented on in the previous paper. The Working Group's responses follow.

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K. H. Kuo notes that quasicrystals are not necessarily defined by the presence of 'forbidden' crystallographic symmetry (*e.g.* decagonal) and points out that these objects can have conventional rotational symmetry. The Working Group was fully aware of this possibility; the definition in the opening paragraph of §7.5 clearly states "A quasicrystal is thus considered to be characterized by the absence of a Bravais lattice **and/or** the observation of 'forbidden' crystallographic symmetry" [bold type added for emphasis]. The 'or' distinctly refers to the situation noted above. This is illustrated by §7.6.2 of the Report in which a 'cubic' quasicrystalline phase of Al₆₉Pd₂₂Mn₉ is included under the label Q2/F2_M.

The Working Group defines approximant phases in the second paragraph of §7.5, quoted by Kuo, who points out that the resemblance to a crystalline phase in the sequence is valid only for the 'strong diffraction peaks'. This may well be true in the illustrative example he evokes. However, the 'strength' of such diffraction peaks depends on the approximant considered. Our nomenclature report deliberately adopts a 'pragmatic definition', as stated in §7.5, which has the advantage of avoiding the complexity of experimental situations that are not yet fully clarified.

We thank K. H. Kuo for correcting the lattice-parameter values for the A1 phase of Al₆₃Cu_{17.5}Co_{17.5}Si₂ in §7.6.1. He points out that the original data should be transformed to a different setting since the orthorhombic approximant lattice parameters were base centred. Our report directly reproduced the original data by Fettweis *et al.* (1995).

Finally, we wish to re-emphasize that the primary concern of our report is with nomenclature. Quasicrystals are conclusively shown in §7.5 to fit the recommended nomenclature well while intentionally avoiding any entry into the discussion by experts on the nature of quasicrystals. The introductory paragraph on quasicrystals stresses the present state of uncertainty concerning the definitions of a quasicrystal, which is quite normal in such a novel and still evolving field. When all such relevant relationships have been clarified, current definitions can indeed be made more precise. We are confident that this will not change our recommended six-field nomenclature for quasicrystals.

References

- Fettweis, M., Launois, P., Reich, R., Wittmann, R. & Denoyer, F. (1995). *Phys. Rev. B*, **51**, 6700–6703.
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