

PREFACE

Though quasicrystals appeared only three years ago it has already gained much ground in crystallography, solid state physics, metallurgy, etc. However, there are still some vital issues which scientists from different disciplines have contradictory views. First and perhaps the most challenging one is: Does quasicrystal really exist? Can it be a set of five, ten or icosahedra? Secondly, many crystallographers familiar with X-ray determination of crystal structures and 230 space groups are still skeptical towards the noncrystallographic symmetry invariably associated with quasicrystals. Thirdly, even among the enthusiastic supporters of quasicrystals, opinions are far from unanimous as far as the structure of quasicrystals is concerned. Penrose tiling is an ingenious design of aperiodic packing of a plane and seems very attractive, but it has packing rules as stringent as in a Bravais lattice. The icosahedral glass model, on the other hand, is too mobile to define the quasicrystalline structure. Finally, we still need to know the atomic structure of the quasicrystal. In the case of quasilattice, what is the atomic decoration? An icosahedron of 12 atoms, the Mackay double icosahedron or an even more complex aggregate like the Pauling polyhedron? And how are they connected? In the icosahedral glass model, how are the icosahedral clusters joined to yield oriented bonds?

Facing these problems it came to my mind that an International Workshop on Quasicrystals with emphasis on crystallography and materials science might be useful and both the Chinese Academy of Sciences and the International Centre of Theoretical Physics (Trieste), our cosponsors, decided immediately to support generously such an endeavour. This idea was also warmly received by the international quasicrystal community and a number of eminent scientists who have done pioneer works in this field have decided right in the beginning to come to this Workshop. I am most grateful to Professor Dan Shechtman, the main discoverer of quasicrystal, Professor Alan Mackay who introduced Penrose tiling to crystallography and coined the term quasilattice, Professor Paul Steinhardt who gave both the name and the theoretical explanation of the diffraction patterns of quasicrystals, and many others for their support, presentation of enlightening papers and active participation in the discussion.

Of course, one cannot expect to solve the main problems of quasicrystals mentioned above during such a short meeting. However, this workshop provides a forum for the participants to present their latest findings, to get to know each other personally and to discuss matters of common interest. This goal has certainly been well achieved and this may help to solve these problems in the future.

Last but not the least, I should like to thank sincerely the Chinese Academy of Sciences and the International Centre for Theoretical Physics (Trieste) for their generous financial support to hold this Workshop in Beijing, August 30-September 5, 1987, and also to my postgraduate students who have spent many busy days and nights in preparing and running this Workshop, especially Dr. Z. Zhang, Ms. X.D. Zou, Ms. X.W. Guo, Mr. C. Dong and Mr. H. Chen.

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