

MOIRE EFFECTS THAT OCCUR IN THE SUPERPOSITION OF PERIODIC LAYERS HAVE BEEN INTENSIVELY INVESTIGATED IN THE PAST, AND THEIR MATHEMATICAL THEORY IS TODAY FULLY UNDERSTOOD. THE SAME IS TRUE FOR MOIRE EFFECTS BETWEEN REPETITIVE LAYERS I.E. BETWEEN GEOMETRIC TRANSFORMATIONS OF PERIODIC LAYERS. HOWEVER, ALTHOUGH MOIRE EFFECTS THAT OCCUR BETWEEN APERIODIC LAYERS (GLASS PATTERNS) ARE KNOWN SINCE THE 1960S, ONLY LITTLE IS KNOWN TODAY ON THEIR MATHEMATICAL BEHAVIOUR. IN THIS BOOK WE STUDY THE BEHAVIOUR OF SUCH MOIRE PATTERNS, AND COMPARE IT WITH ANALOGOUS RESULTS FROM THE PERIODIC CASE. WE SHOW THAT ALL CASES, PERIODIC OR NOT, OBEY THE SAME BASIC MATHEMATICAL RULES IN SPITE OF THEIR DIFFERENT VISUAL PROPERTIES. THIS LEADS US TO A UNIFIED APPROACH WHICH EXPLAINS BOTH THE BEHAVIOUR OF GLASS PATTERNS IN THE APERIODIC CASE, AND THE WELL KNOWN BEHAVIOUR OF THE MOIRE PATTERNS IN PERIODIC CASES. WE SHOW THAT ALL CASES, PERIODIC OR NOT, OBEY THE SAME BASIC MATHEMATICAL RULES IN SPITE OF THEIR DIFFERENT VISUAL PROPERTIES. THIS LEADS US TO A UNIFIED APPROACH WHICH EXPLAINS BOTH THE BEHAVIOUR OF GLASS PATTERNS IN THE APERIODIC CASE, AND THE WELL KNOWN BEHAVIOUR OF THE MOIRE PATTERNS IN PERIODIC CASES.

(a)

(b)

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(d)

Figure 3.23 from the book: *The Theory of the Moiré Phenomenon Vol. II: Aperiodic Layers*, by I. Amidror, published by Springer, 2007.

(Second layer only.)