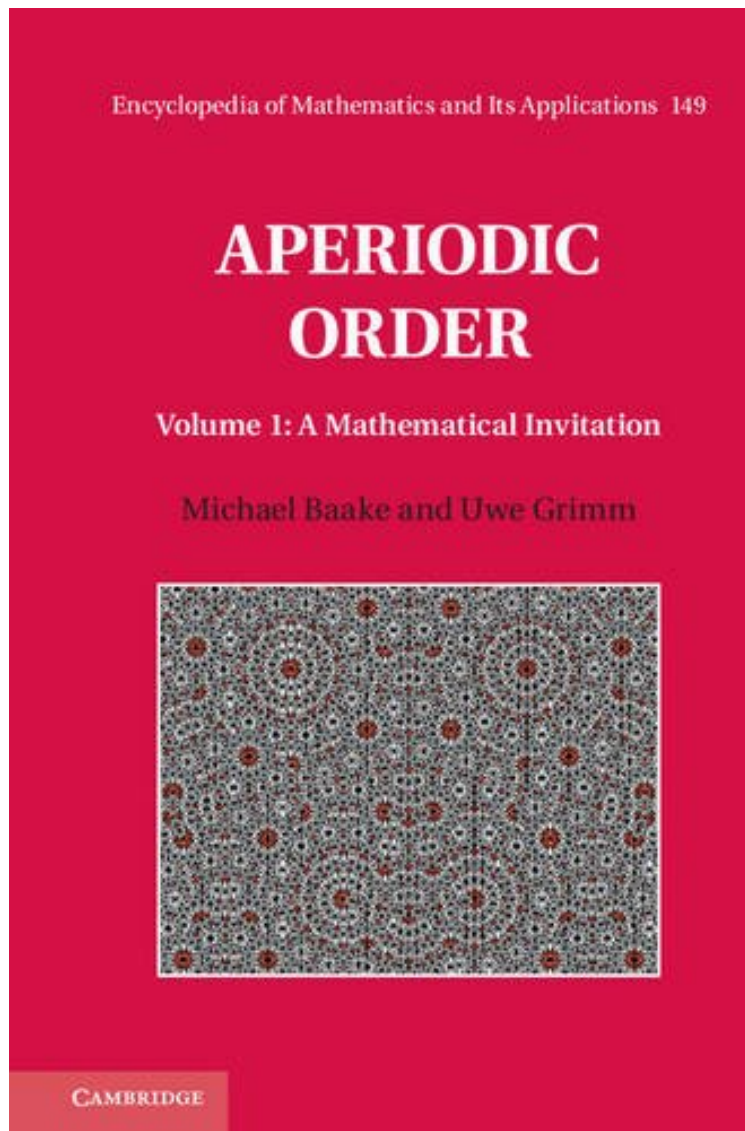


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Aperiodic Order: Volume 1, A Mathematical Invitation (Encyclopedia of Mathematics and its Applications)

Michael Baake, Uwe Grimm

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Quasicrystals are non-periodic solids that were discovered in 1982 by Dan Shechtman, Nobel Prize Laureate in Chemistry 2011. The underlying mathematics, known as the theory of aperiodic order, is the subject of this comprehensive multi-volume series. This first volume provides a graduate-level introduction to the many facets of this relatively new area of mathematics. Special attention is given to methods from algebra, discrete geometry and harmonic analysis, while the main focus is on topics motivated by physics and crystallography. In particular, the authors provide a systematic exposition of the mathematical theory of kinematic diffraction. Numerous illustrations and worked-out examples help the reader to bridge the gap between theory and application. The authors also point to more advanced topics to show how the theory interacts with other areas of pure and applied mathematics.

"Mathematicians add hypotheses to theorems either to bar known monsters or provisionally to enable proof, pending better ideas that lead to more general results ... Monsters no more, aperiodic fillings have joined mainstream mathematics, and undergraduates drawn here by beautiful graphics will find themselves initiated into algebraic number theory, Lie theory, ergodic theory, dynamical systems, finite-state automata, Fourier analysis, and more." D. V. Feldman, University of New Hampshire
About the Author Michael Bakke is a Professor of Mathematics at Bielefeld University, Germany. He has been working on the theory of quasicrystals since 1987 and during that time organised several international meetings on the mathematics of aperiodic order, including workshops at Banff, Oberwolfach and the Erwin Schrödinger Institute in Vienna. Uwe Grimm is a Professor of Mathematics in the Faculty of Mathematics, Computing and Technology at the Open University, Milton Keynes. He has been working on the mathematics and physics of aperiodically ordered systems for nearly 20 years. He co-organised the 6th International Conference on Aperiodic Crystals in Liverpool in 2009 and is a member of the Commission on Aperiodic Crystals of the International Union of Crystallography.