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Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Preliminary Facts -- From One-dimensional to Multidimensional -- Asymptotic Formulas for the Bloch Eigenvalues and Bloch Functions -- Constructive Determination of the Spectral Invariants -- Periodic Potential from the Spectral Invariants -- Conclusions and Some Generalization.
Sommario/riassunto	This book describes the direct and inverse problems of the multidimensional Schrödinger operator with a periodic potential, a topic that is especially important in perturbation theory, constructive determination of spectral invariants and finding the periodic potential from the given Bloch eigenvalues. It provides a detailed derivation of the asymptotic formulas for Bloch eigenvalues and Bloch functions in arbitrary dimensions while constructing and estimating the measure of the iso-energetic surfaces in the high-energy regime. Moreover, it

presents a unique method proving the validity of the Bethe–Sommerfeld conjecture for arbitrary dimensions and arbitrary lattices. Using the perturbation theory constructed, it determines the spectral invariants of the multidimensional operator from the given Bloch eigenvalues. Some of these invariants are explicitly expressed by the Fourier coefficients of the potential, making it possible to determine the potential constructively using Bloch eigenvalues as input data. Lastly, the book presents an algorithm for the unique determination of the potential. This updated and significantly expanded third edition features an extension of this framework to all dimensions, offering a now complete theory of self-adjoint Schrödinger operators within periodic potentials. Drawing from recent advancements in mathematical analysis, this edition delves even deeper into the intricacies of the subject. It explores the connections between the multidimensional Schrödinger operator, periodic potentials, and other fundamental areas of mathematical physics. The book's comprehensive approach equips both students and researchers with the tools to tackle complex problems and contribute to the ongoing exploration of quantum phenomena.