This book is a new edition of a title originally published in 1992. No other book has been published that treats inverse spectral and inverse scattering results by using the so-called Poisson summation formula and the related study of singularities. This book presents these in a closed and comprehensive form, and the exposition is based on a combination of different tools and results from dynamical systems, microlocal analysis, spectral and scattering theory.

The content of the first edition is still relevant, however the new edition will include several new results established after 1992; new text will comprise about a third of the content of the new edition. The main chapters in the first edition in combination with the new chapters will provide a better and more comprehensive presentation of importance for the applications inverse results. These results are obtained by modern mathematical techniques which will be presented together in order to give the readers the opportunity to completely understand them. Moreover, some basic generic properties established by the authors after the publication of the first edition establishing the wide range of applicability of the Poisson relation will be presented for the first time in the new edition of the book.

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