

1. Record Nr.	UNINA9910736987803321
Autore	Ali Syed Twareque
Titolo	Coherent States, Wavelets, and Their Generalizations // by Syed Twareque Ali, Jean-Pierre Antoine, Jean-Pierre Gazeau
Pubbl/distr/stampa	New York, NY : , : Springer New York : , : Imprint : Springer, , 2014
ISBN	1-4614-8535-5
Edizione	[2nd ed. 2014.]
Descrizione fisica	1 online resource (586 p.)
Collana	Theoretical and Mathematical Physics, , 1864-5879
Classificazione	81-02, 81R30, 42C40
Disciplina	586
Soggetti	Quantum theory Group theory Quantum computers Spintronics Quantum Physics Group Theory and Generalizations Quantum Information Technology, Spintronics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Canonical Coherent States -- Positive Operator-Valued Measures and Frames -- Some Group Theory -- Hilbert Spaces -- Square Integrable and Holomorphic Kernels -- Covariant Coherent States -- Coherent States from Square Integrable Representations -- Some Examples and Generalizations -- CS of General Semidirect Product Groups -- CS of Product Groups -- CS Quantizations and Probabilistic Aspects -- Direct Wavelet Transforms -- Multidimensional Wavelets -- Wavelets Related to Other G Groups -- The Discretization Problem - Frames Sampling and All That.
Sommario/riassunto	This second edition is fully updated, covering in particular new types of coherent states (the so-called Gazeau-Klauder coherent states, nonlinear coherent states, squeezed states, as used now routinely in quantum optics) and various generalizations of wavelets (wavelets on manifolds, curvelets, shearlets, etc.). In addition, it contains a new chapter on coherent state quantization and the related probabilistic aspects. As a survey of the theory of coherent states, wavelets, and some of their generalizations, it emphasizes mathematical principles,

subsuming the theories of both wavelets and coherent states into a single analytic structure. The approach allows the user to take a classical-like view of quantum states in physics. Starting from the standard theory of coherent states over Lie groups, the authors generalize the formalism by associating coherent states to group representations that are square integrable over a homogeneous space; a further step allows one to dispense with the group context altogether. In this context, wavelets can be generated from coherent states of the affine group of the real line, and higher-dimensional wavelets arise from coherent states of other groups. The unified background makes transparent an entire range of properties of wavelets and coherent states. Many concrete examples, such as coherent states from semisimple Lie groups, Gazeau-Klauder coherent states, coherent states for the relativity groups, and several kinds of wavelets, are discussed in detail. The book concludes with a palette of potential applications, from the quantum physically oriented, like the quantum-classical transition or the construction of adequate states in quantum information, to the most innovative techniques to be used in data processing. Intended as an introduction to current research for graduate students and others entering the field, the mathematical discussion is self-contained. With its extensive references to the research literature, the first edition of the book is already a proven compendium for physicists and mathematicians active in the field, and with full coverage of the latest theory and results the revised second edition is even more valuable.
