1. **Record Nr.** UNISA996466515103316

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Titolo Representation theory and complex analysis : lectures given at the C.I.M.E. summer school held in Venice, Italy, June 10-17, 2004 / / Michael Cowling [and five others.] ; editors, Enrico Casadio Tarabusi, Andrea D' Agnolo, Massimo Picardello

Pubbl/distr/stampa Berlin, Germany ; ; New York, New York : , : Springer-Verlag, , [2008] ©2008

ISBN 3-540-76892-0

Edizione [1st ed. 2008.]

Descrizione fisica 1 online resource (XII, 389 p.)

Collana C.I.M.E. Foundation Subseries ; ; 1931

Disciplina 515.9

Soggetti Representations of groups
Harmonic analysis

Lingua di pubblicazione Inglese

Formato Materiale a stampa

Livello bibliografico Monografia

Note generali Bibliographic Level Mode of Issuance: Monograph

Nota di bibliografia Includes bibliographical references and index.

Nota di contenuto Applications of Representation Theory to Harmonic Analysis of Lie Groups (and Vice Versa) -- Ramifications of the Geometric Langlands Program -- Equivariant Derived Category and Representation of Real Semisimple Lie Groups -- Amenability and Margulis Super-Rigidity -- Unitary Representations and Complex Analysis -- Quantum Computing and Entanglement for Mathematicians.

Sommario/riassunto Six leading experts lecture on a wide spectrum of recent results on the subject of the title, providing both a solid reference and deep insights on current research activity. Michael Cowling presents a survey of various interactions between representation theory and harmonic analysis on semisimple groups and symmetric spaces. Alain Valette recalls the concept of amenability and shows how it is used in the proof of rigidity results for lattices of semisimple Lie groups. Edward Frenkel describes the geometric Langlands correspondence for complex algebraic curves, concentrating on the ramified case where a finite number of regular singular points is allowed. Masaki Kashiwara studies the relationship between the representation theory of real semisimple Lie groups and the geometry of the flag manifolds associated with the corresponding complex algebraic groups. David Vogan deals with the

problem of getting unitary representations out of those arising from complex analysis, such as minimal globalizations realized on Dolbeault cohomology with compact support. Nolan Wallach illustrates how representation theory is related to quantum computing, focusing on the study of qubit entanglement.