

Sir Charles Frank, OBE, FRS

An eightieth birthday tribute

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Sir Charles Frank Obe Frs An Eightieth Birthday Tribute

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Sir Charles Frank OBE FRS An Eightieth Birthday Tribute:

Sir Charles Frank OBE, FRS, An Eightieth Birthday Tribute R. G. Chambers, 1991-02 Sir Charles Frank is one of the foremost scientists of the last fifty years He has made important advances in a large number of different fields in physics notably the properties of dislocations in crystals This book is a celebration of his work with contributions from many of his former colleagues and students The contributors are all eminent in their particular fields and the great variety in their contributions demonstrates the vast impact Sir Charles has had on modern physics The papers range over many of the fields in which Sir Charles has worked These include crystal growth and crystal properties liquid crystals particle physics metallurgy polymer physics materials science geophysics and the mechanics of the Earth's crust A major part of the book is concerned with the subject with which he is most closely associated namely the behaviour of dislocations in crystals The contributions are mainly of two types There are reviews of Sir Charles work concentrating on his original ideas and extensions of his theories that have been made by other researchers There are also original contributions describing the outcome of new and ongoing research showing that Sir Charles pioneering work is still producing important results Also included are reminiscences of Sir Charles life and work at Bristol and elsewhere with many anecdotes demonstrating his unique approach to research and teaching Because of the wide ranging nature of Sir Charles Frank's work this collection of essays will be of great interest to scientists in a wide range of fields

Memorial Tributes National Academy of Engineering, 2013-10-07 This is the 17th Volume in the series Memorial Tributes compiled by the National Academy of Engineering as a personal remembrance of the lives and outstanding achievements of its members and foreign associates These volumes are intended to stand as an enduring record of the many contributions of engineers and engineering to the benefit of humankind In most cases the authors of the tributes are contemporaries or colleagues who had personal knowledge of the interests and the engineering accomplishments of the deceased Through its members and foreign associates the Academy carries out the responsibilities for which it was established in 1964 Under the charter of the National Academy of Sciences the National Academy of Engineering was formed as a parallel organization of outstanding engineers Members are elected on the basis of significant contributions to engineering theory and practice and to the literature of engineering or on the basis of demonstrated unusual accomplishments in the pioneering of new and developing fields of technology The National Academies share a responsibility to advise the federal government on matters of science and technology The expertise and credibility that the National Academy of Engineering brings to that task stem directly from the abilities interests and achievements of our members and foreign associates our colleagues and friends whose special gifts we remember in this book

The Selected Works of John W. Cahn W. Craig Carter, William C. Johnson, 2013-10-28 This book represents a collection of 30 selected papers from the work of John W Cahn Dr Cahn is Senior Fellow at the Materials Science and Engineering Laboratory of the National Institute of Standards and Technology and is widely recognized as a

founder of modern theory and thought in materials science The range of his research included kinetics and mechanisms of metallurgical phase changes surfaces interfaces defects quasicrystals thermodynamics and other areas impacting the fundamental understanding of materials science Each paper includes a 2-4 page review of the impact and historical perspective of the work This is an important collection for students instructors and scientists interested in materials science

Visual Differential Geometry and Forms Tristan Needham, 2021-07-13 An inviting intuitive and visual exploration of differential geometry and forms Visual Differential Geometry and Forms fulfills two principal goals In the first four acts Tristan Needham puts the geometry back into differential geometry Using 235 hand drawn diagrams Needham deploys Newton's geometrical methods to provide geometrical explanations of the classical results In the fifth act he offers the first undergraduate introduction to differential forms that treats advanced topics in an intuitive and geometrical manner Unique features of the first four acts include four distinct geometrical proofs of the fundamentally important Global Gauss-Bonnet theorem providing a stunning link between local geometry and global topology a simple geometrical proof of Gauss's famous Theorema Egregium a complete geometrical treatment of the Riemann curvature tensor of an n -manifold and a detailed geometrical treatment of Einstein's field equation describing gravity as curved spacetime General Relativity together with its implications for gravitational waves black holes and cosmology The final act elucidates such topics as the unification of all the integral theorems of vector calculus the elegant reformulation of Maxwell's equations of electromagnetism in terms of 2-forms de Rham cohomology differential geometry via Cartan's method of moving frames and the calculation of the Riemann tensor using curvature 2-forms Six of the seven chapters of Act V can be read completely independently from the rest of the book Requiring only basic calculus and geometry Visual Differential Geometry and Forms provocatively rethinks the way this important area of mathematics should be considered and taught

Nonlinear Partial Differential Equations Gui-Qiang Chen, Emmanuele DiBenedetto, 1999 This volume is a collection of original research papers and expository articles stemming from the scientific program of the Nonlinear PDE Emphasis Year held at Northwestern University Evanston IL in March 1998 The book offers a cross section of the most significant recent advances and current trends and directions in nonlinear partial differential equations and related topics The book's contributions offer two perspectives There are papers on general analytical treatment of the theory and papers on computational methods and applications originating from significant realistic mathematical models of natural phenomena Also included are articles that bridge the gap between these two perspectives seeking synergistic links between theory and modeling and computation The volume offers direct insight into recent trends in PDEs This volume is also available on the Web Those who purchase the print edition can gain free access by going to www.ams.org/conm

Ice Physics and the Natural Environment John S. Wettlaufer, J. Gregory Dash, Norbert Untersteiner, 2013-06-29 The Advanced Study Institute Ice Physics in the Natural and Endangered Environment was held at Acquafredda di Maratea Italy from September 7 to 19 1997 The ASI was designed to study the broad range of ice science and

technology and it brought together an appropriately interdisciplinary group of lecturers and students to study the many facets of the subject. The talks and poster presentations explored how basic molecular physics of ice have important environmental consequences and conversely how natural phenomena present new questions for fundamental study. The lectures discuss these linkages in order that overall unity of following summary of the subject and this volume can be perceived. Not all of the lecturers and participants were able to contribute a written piece but their active involvement was crucial to the success of the Institute and thereby influenced the content of the volume. We began the Institute by retracing the history of the search for a microscopic understanding of melting. Our motivation was straightforward. Nearly every phenomenon involving ice in the environment is influenced by the change of phase from solid to liquid or vice versa. Hence a sufficiently deep physical picture of the melting transition enriches our appreciation of a vast array of geophysical and technical problems.

Natural Focusing and Fine Structure of Light J.F Nye, 1999-01-01 A new kind of optics has grown up during the last 25 years. Geometrical optics has been studied for centuries; the law of reflection was known to the ancient Greeks and wave optics heralded by Huygens' Treatise on Light has been studied for more than 300 years. But in the mid 1970s it began to be understood that when natural processes focus light as when sunlight is reflected from the sea at sunset the light caustics that are produced have a systematic behavior previously unrecognized. *Natural Focusing and Fine Structure of Light: Caustics and Wave Dislocations* provides a definitive account of how classical optics has been reconstructed in a modern way by emphasizing the hierarchy of singularities that exists in light fields. The book discusses the singularities of geometrical optics and their systematization by catastrophe theory. It explores the diffraction patterns associated with caustics that are dominated by wave dislocations, line singularities of the phase and analogous to crystal dislocations. The book is a perfect blend of mathematics and physics combining theory, computer simulation and beautiful experimental photographs of the phenomena studied.

Kinetics of Materials Robert W. Balluffi, Samuel M. Allen, W. Craig Carter, 2005-12-07 KINETICS OF MATERIALS: A CLASSROOM TESTED TEXTBOOK PROVIDING A FUNDAMENTAL UNDERSTANDING OF BASIC KINETIC PROCESSES IN MATERIALS. This textbook reflecting the hands-on teaching experience of its three authors evolved from Massachusetts Institute of Technology's first year graduate curriculum in the Department of Materials Science and Engineering. It discusses key topics collectively representing the basic kinetic processes that cause changes in the size, shape, composition and atomistic structure of materials. Readers gain a deeper understanding of these kinetic processes and of the properties and applications of materials. Topics are introduced in a logical order enabling students to develop a solid foundation before advancing to more sophisticated topics. *Kinetics of Materials* begins with diffusion, offering a description of the elementary manner in which atoms and molecules move around in solids and liquids. Next the more complex motion of dislocations and interfaces is addressed. Finally still more complex kinetic phenomena such as morphological evolution and phase transformations are treated. Throughout the textbook readers are

instilled with an appreciation of the subjects analytic foundations and in many cases the approximations commonly used in the field The authors offer many extensive derivations of important results to help illuminate their origins While the principal focus is on kinetic phenomena in crystalline materials select phenomena in noncrystalline materials are also discussed In many cases the principles involved apply to all materials Exercises with accompanying solutions are provided throughout Kinetics of Materials enabling readers to put their newfound knowledge into practice In addition bibliographies are offered with each chapter helping readers to investigate specialized topics in greater detail Several appendices presenting important background material are also included With its unique range of topics progressive structure and extensive exercises this classroom tested textbook provides an enriching learning experience for first year graduate students Mathematical Research in Materials Science National Research Council, Division on Engineering and Physical Sciences, Commission on Physical Sciences, Mathematics, and Applications, Committee on Mathematical Sciences Applied to Materials Science, 1993-02-01 This book describes fruitful past collaborations between the mathematical and materials sciences and indicates future challenges It seeks both to encourage mathematical sciences research that will complement vital research in materials science and to raise awareness of the value of quantitative methods The volume encourages both communities to increase cross disciplinary collaborations emphasizing that each has much to gain from such an increase and it presents recommendations for facilitating such work This book is written for both mathematical and materials science researchers interested in advancing research at this interface for federal and state agency representatives interested in encouraging such collaborations and for anyone wanting information on how such cross disciplinary collaborative efforts can be accomplished successfully **Geometric Phases in Classical and Quantum Mechanics** Dariusz Chruscinski, Andrzej Jamiolkowski, 2012-12-06 Several well established geometric and topological methods are used in this work in an application to a beautiful physical phenomenon known as the geometric phase This book examines the geometric phase bringing together different physical phenomena under a unified mathematical scheme The material is presented so that graduate students and researchers in applied mathematics and physics with an understanding of classical and quantum mechanics can handle the text

Sir Charles Frank Obe Frs An Eightieth Birthday Tribute Book Review: Unveiling the Power of Words

In a world driven by information and connectivity, the ability of words has become more evident than ever. They have the ability to inspire, provoke, and ignite change. Such may be the essence of the book **Sir Charles Frank Obe Frs An Eightieth Birthday Tribute**, a literary masterpiece that delves deep to the significance of words and their impact on our lives. Compiled by a renowned author, this captivating work takes readers on a transformative journey, unraveling the secrets and potential behind every word. In this review, we will explore the book's key themes, examine its writing style, and analyze its overall effect on readers.

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