1. Record Nr. UNISA996466735303316

Autore	Gallo Paola
Titolo	Physics of liquid matter / / Paola Gallo and Mauro Rovere
Pubbl/distr/stampa	Cham, Switzerland : , : Springer, , [2021] ©2021
ISBN	3-030-68349-4
Descrizione fisica	1 online resource (338 pages)
Collana	Soft and Biological Matter
Disciplina	632.05
Soggetti	Fluid dynamics Hydrodynamics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Includes index.
Nota di contenuto	Intro -- Preface -- Contents -- Acronyms -- 1 An Introduction to the Liquid State of Matter -- 1.1 Liquid State of Matter -- 1.1.1 Examples of Phase Diagram of Pure Substances: CO2 and Water -- 1.1.2 Phase Diagram of Binary Mixtures -- 1.2 Structure and Dynamics of Liquids: Experiments and Correlation Functions -- 1.3 Microscopic Models for Liquids -- 1.3.1 Classical Approximation -- 1.3.2 Different Models -- 1.4 Potential Energy Landscape -- 1.5 Approximate Theories and Computer Simulation -- 1.6 Water and Hydrogen Bond -- 1.7 Metastable States and Disordered Solid Matter -- 1.8 Soft Matter -- 1.8.1 Colloids -- 1.8.2 Biomolecules -- References -- 2 Thermodynamics and Statistical Mechanics of Fluid States -- 2.1 Extensive and Intensive Functions -- 2.2 Energy and Entropy -- 2.3 Gibbs-Duhem Relation -- 2.4 Equilibrium Conditions -- 2.5 Equilibrium Conditions and Intensive Quantities -- 2.6 Macroscopic Response Functions and Stability Conditions -- 2.7 Legendre Transforms and Thermodynamic Potentials -- 2.7.1 Helmholtz Free Energy -- 2.7.2 Gibbs Free Energy -- 2.7.3 Enthalpy -- 2.7.4 Grand Canonical Potential -- 2.7.5 Tabulated Thermodynamic Potentials -- 2.8 Stability Conditions for Thermodynamic Potentials -- 2.9 Coexistence and Phase Transitions -- 2.10 Phase Transitions and Their Classifications -- 2.11 Van der Waals Equation -- 2.12 General Form of the Van der Waals Equation and Corresponding States -- 2.13 Critical

Behaviour of the Van der Waals Equation -- 2.14 Ensembles in Statistical Mechanics -- 2.14.1 Microcanonical Ensemble -- 2.14.2 Canonical Ensemble -- 2.14.3 Grand Canonical Ensemble -- 2.14.4 Isobaric-Isothermal Ensemble -- 2.15 Fluctuations and Thermodynamics -- References -- 3 Microscopic Forces and Structure of Liquids -- 3.1 Force Field for Atoms in Liquids -- 3.2 Local Structure of a Liquid.
3.3 Distribution Functions in the Canonical Ensemble -- 3.4 Relation of the RDF with Thermodynamics -- 3.4.1 Energy -- 3.4.2 Pressure from the Virial -- 3.5 Distribution Functions in the Grand Canonical Ensemble -- 3.6 Hierarchical Equations -- 3.7 Qualitative Behaviour of the Radial Distribution Function -- 3.8 Experimental Determination of the Structure of Liquids -- 3.9 Neutron Scattering on Liquids -- 3.10 Static Limit and the Structure of Liquid -- 3.11 The Static Structure Factor -- 3.12 The Structure Factor and the RDF of Liquid Argon -- 3.13 The Structure Factor Close to a Critical Point -- 3.14 Structure of Multicomponent Liquids -- 3.14.1 Partial Structure Factor of Multicomponent Liquids -- 3.14.2 Isotopic Substitution -- 3.14.3 An Example: Molten Salts -- 3.15 Structure of Molecular Liquids -- 3.15.1 Structure of Liquid Water -- References -- 4 Theoretical Studies of the Structure of Liquids -- 4.1 Virial Expansion in the Canonical Ensemble -- 4.1.1 From Hard Spheres to the Van der Waals Equation -- 4.2 The Mean Force Potential -- 4.3 Kirkwood Approximation -- 4.4 Radial Distribution Function from the Excess Free Energy -- 4.5 Density Distributions from the Grand Partition Function -- 4.6 Grand Potential as Generating Functional -- 4.7 Classical Density Functional Theory -- 4.7.1 Equilibrium Conditions -- 4.7.2 The Ornstein-Zernike Equation -- 4.7.3 The Ornstein-Zernike Equation in k-Space -- 4.7.4 Free Energy Calculation -- 4.7.5 Expansion from the Homogeneous System -- 4.8 Closure Relations from the Density Functional Theory -- 4.9 An Exact Equation for the g(r) -- 4.10 HNC and Percus-Yevick Approximations -- 4.10.1 RPA and MSA -- 4.11 Properties of the Hard Sphere Fluid -- 4.12 Equation of State and Liquid-Solid Transition of Hard Spheres -- 4.13 Percus-Yevick for the Hard Sphere Fluid.
4.14 Equation of State and Thermodynamic Inconsistency -- 4.15 Routes to Consistency: Modified HNC and Reference HNC -- 4.16 Perturbation Theories: Optimized RPA -- 4.17 Models for Colloids -- References -- 5 Methods of Computer Simulation -- 5.1 Molecular Dynamics Methods -- 5.1.1 Molecular Dynamics and Statistical Mechanics -- 5.1.2 Algorithms for the Time Evolution -- 5.1.3 Predictor/Corrector -- 5.1.4 Verlet Algorithms -- Velocity Verlet -- Leapfrog -- 5.1.5 Calculation of the Forces -- 5.1.6 Initial Configuration -- 5.1.7 Temperature in the Microcanonical Ensemble -- 5.1.8 Equilibration Procedure -- 5.1.9 Thermodynamic and Structure -- 5.1.10 Long-Range Corrections -- 5.1.11 Ewald Method -- 5.2 Monte Carlo Simulation -- 5.2.1 Monte Carlo Integration and Importance Sampling -- 5.2.2 Integrals in Statistical Mechanics -- 5.2.3 Importance Sampling in Statistical Mechanics -- 5.2.4 Markov Processes -- 5.2.5 Ergodicity and Detailed Balance -- 5.2.6 Metropolis Method -- 5.2.7 Averaging on Monte Carlo Steps -- 5.2.8 MC Sampling in Other Ensembles -- Isobaric-Isothermal MC -- Grand Canonical MC -- 5.2.9 MC in the Gibbs Ensemble -- 5.3 MD in Different Ensembles -- 5.3.1 Controlling the Temperature: MD in the Canonical Ensemble -- The Nose Method -- Hoover Equations -- 5.3.2 Pressure Control -- 5.4 Molecular Liquids -- 5.5 Microscopic Models for Water -- 5.6 Some More Hints -- 5.7 Direct Calculations of the Equation of State -- 5.8 Free Energy Calculation from Thermodynamic Integration -- 5.9 An Example: Liquid-Solid Transition -- 5.10 Calculation of the Chemical

Potential: The Widom Method -- 5.11 Sampling in a Complex Energy Landscape -- 5.12 Umbrella Sampling -- 5.13 Histogram Methods -- 5.14 Free Energy Along a Reaction Coordinate -- 5.14.1 Umbrella Sampling for Reaction Coordinates -- 5.14.2 Metadynamics -- 5.15 Simulation of Critical Phenomena.
References -- 6 Dynamical Correlation Functions and Linear Response Theory for Fluids -- 6.1 Dynamical Observables -- 6.2 Correlation Functions -- 6.2.1 Further Properties of the Correlation Functions -- 6.3 Linear Response Theory -- 6.4 Dynamical Response Functions -- 6.5 Fluctuation-Dissipation Theorem -- 6.6 Response Functions and Dissipation -- 6.7 Density Correlation Functions and Van Hove Functions -- 6.8 Neutron Scattering to Determine the Liquid Dynamics -- 6.9 Dynamic Structure Factor -- 6.9.1 Static Limit -- 6.9.2 Incoherent Scattering -- 6.10 Density Fluctuations and Dissipation -- 6.10.1 Detailed Balance -- 6.11 Static Limit of the Density Fluctuations -- 6.12 Static Response Function and the Verlet Criterion -- References -- 7 Dynamics of Liquids -- 7.1 Thermal Motion in Liquids -- 7.2 Brownian Motion and Langevin Equation -- 7.3 Diffusion and Self Van Hove Function -- 7.4 Limit of the Dilute Gas -- 7.5 Short Time Expansion of the Self-Intermediate Scattering Function -- 7.6 Correlation Functions of the Currents -- 7.7 The Hydrodynamic Limit -- 7.8 Diffusion in the Hydrodynamic Limit -- 7.9 Velocity Correlation Function -- 7.10 Liquid Dynamics in the Hydrodynamic Limit -- 7.10.1 Transverse Current -- 7.10.2 Equations Under Isotherm Conditions, Longitudinal Current and Sound Waves -- 7.10.3 Longitudinal Current in Presence of Thermal Diffusion and Brillouin Scattering -- 7.11 Different Regimes for the Liquid Dynamics: The De Gennes Narrowing -- 7.12 Introduction of Memory Effects -- 7.12.1 The Langevin Equation and Memory Effects -- 7.12.2 Viscoelasticity: The Maxwell Model -- 7.12.3 Generalized Viscosity and Memory Effects -- 7.13 Definition of Memory Functions -- 7.14 Memory Function for the Velocity Correlation Function -- References -- 8 Supercooled Liquids: Glass Transition and Mode Coupling Theory.
8.1 Phase Transitions and Metastability of Liquids -- 8.2 Liquids Upon Supercooling: From the Liquid to the Glass -- 8.3 Angell Plot -- 8.4 Kauzmann Temperature -- 8.5 Adam and Gibbs Theory -- 8.5.1 Cooperative Rearranging Regions -- 8.5.2 Calculation of the Configurational Entropy -- 8.6 Energy Landscape and Configurational Entropy -- 8.7 Dynamics of the Supercooled Liquid and Mode Coupling Theory -- 8.7.1 Dynamics Upon Supercooling -- 8.7.2 Mode Coupling Theory and Cage Effect -- 8.7.3 Formulation of the Theory -- 8.7.4 Glass Transition as Ergodic to Non-ergodic Crossover -- 8.7.5 The -Relaxation -- 8.7.6 -Relaxation -- References -- 9 Supercooled Water -- 9.1 Supercooled and Glassy Water -- 9.2 The Hypothesis of a Liquid-Liquid Critical Point -- 9.3 The Widom Line at the Liquid-Liquid Transition -- 9.4 Water as a Two-Component Liquid -- 9.5 Dynamical Properties of Water Upon Supercooling -- 9.6 Widom Line and the Fragile to Strong Crossover -- References -- Index.

2.

Record Nr.	UNINA9910495245703321
Autore	Tausch Arno <1951->
Titolo	The Future of the Gulf Region : Value Change and Global Cycles / / by Arno Tausch
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2021
ISBN	9783030782993 3030782999
Edizione	[1st ed. 2021.]
Descrizione fisica	1 online resource (470 pages)
Collana	Gulf Studies, , 2662-4508 ; ; 2
Disciplina	956.054
Soggetti	Middle East - Politics and government Economic history Political sociology Religion and sociology Religion and politics Statistics Middle Eastern Politics Economy-wide Country Studies Political Sociology Sociology of Religion Politics and Religion Applied Statistics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Includes index.
Nota di contenuto	Chapter 1. Introduction: Factors affecting the Gulf's future -- Chapter 2. Methodology and data for assessing the effects of Global Cycles and Value Change on the Future of the Gulf Region -- Chapter 3. Covid-19 and the contours of the impending global crisis: Western meltdown, Gulf fallout? -- Chapter 4. Caught in the “Thucydides Trap”? Revisiting Kondratieff Waves, Warfare and World Security and their implications for the Gulf region -- Chapter 5. Learning from classical Arab writers: G-Zero and the cultural aspects of changing global leadership: rediscovering Ibn Khaldun’s “Asabiyya” with the latest PEW Global

Survey and World Values Survey data -- Chapter 6. Value change and patterns of development in the rich Arab countries -- Chapter 7. Antisemitism – the second contemporary pandemic and what the Gulf countries can do to overcome it -- Chapter 8. Saudi Arabia - Religion, gender and the desire for democracy -- Chapter 9. Executive Summary, Conclusions and Perspectives.

Sommario/riassunto

This book studies values and attitudes in the Gulf region. In light of global power shifts, the threatening collapse of internal security in the West, and uncertainty about the current leadership vacuum in world society, this book explores a future leading role of the Gulf countries in such institutions as the G-20 and the OECD. Based on rigorous analysis of macro-level data and opinion surveys with relevance for the Gulf region, it analyzes the global macro-factors shaping the Gulf's future at a time of the global COVID-19 crisis and depression and rising global tensions. Starting with an empirical time series analysis of the long cycles of global politics and economics, it highlights the implications for the Gulf region. Offering a multivariate analysis of civil society values in the Gulf, the author analyzes value changes and attitudes on antisemitism, political Islam, internal security, democracy, and other issues of Arab politics. The partially optimistic conclusionsof the study testify to the underestimated and incipient maturity of the Gulf’s civil society and strongly suggest that the Gulf's future is rather with the free societies of the West and not with a Neo-Ottoman Empire in whatever form. "Exceptional in scope and right up-to-the-minute in coverage" Brian M Pollins, Associate, Professor Emeritus, The Ohio State University. "An outstanding and topical book by an astute scholar of the MENA region" Professor Hussein Solomon, Academic Head of Department, Political Studies and Governance, University of the Free State, South Africa. "The most comprehensive and insightful study on the subject to date" Manfred B. Steger, Professor of Sociology, University of Hawai'i at Manoa and Global Professorial Fellow, Western Sydney University.