MANY-BODY THEORY OF MOLECULES, CLUSTERS, AND CONDENSED PHASES

editors

N. H. March
Oxford University, UK & University of Antwerp, Belgium

G. G. N. Angilella
Università di Catania, CNISM & INFN, Italy
Contents

Part 1: Quantal electron crystals

[1] N. H. March,
Kinetic and potential energies of an electron gas,
© Copyright permission paid to the American Physical Society on 2009-01-02.

[2] N. H. March and W. H. Young,
Probability density of electron separation in a uniform electron gas,
© Copyright permission obtained from Taylor & Francis.

[3] W. H. Young and N. H. March,
A density matrix approach to correlation in a uniform electron gas,
© Copyright permission obtained by The Royal Society.

Localization of electrons in impure semiconductors by a magnetic field,
© Copyright permission paid to the American Physical Society on 2009-01-02.

[5] C. M. Care and N. H. March,
Electrical conduction in the Wigner lattice in n type InSb in a magnetic field,
© Copyright permission obtained from IoP on 2008-09-24.

[6] C. M. Care and N. H. March,
Electron crystallization,
© Copyright permission obtained from Taylor & Francis.

[7] M. Parrinello and N. H. March,
Thermodynamics of Wigner crystallization,
© Copyright permission obtained from IoP on 2008-09-24.


*Self-consistent force constant calculation for a two-dimensional Wigner electron crystal in high magnetic fields, and limitations of Lindemann's Law of melting,* 

[16] A. Holas and N. H. March, 
*Remnants of the Fermi surface in the Wigner electron crystal phase of a strongly interacting one-dimensional system,* 

[17] M. J. Lea, N. H. March, and W. Sung, 
*Melting of Wigner electron crystals: phenomenology and anyon magnetism,* 

[18] N. H. March, 
*Melting of a magnetically induced Wigner electron solid and anyon properties,* 

[19] G. Senatore and N. H. March, 
*Recent progress in the field of electron correlation,* 

[20] N. H. March, 
*Thermodynamics of the equilibrium between a fractional quantum Hall liquid and a Wigner electron solid,* 

[21] R. H. Squire and N. H. March, 
*Fulleride superconductivity compared and contrasted with RVB theory of high Tc cuprates,* 
<table>
<thead>
<tr>
<th>Reference</th>
<th>Authors</th>
<th>Title</th>
<th>Journal</th>
<th>Volume/Issue</th>
<th>Pages</th>
<th>Publisher</th>
<th>Copyright Permission</th>
</tr>
</thead>
<tbody>
<tr>
<td>[23]</td>
<td>F. Claro, A. Cabo, and N. H. March,</td>
<td>On the phase diagram of a two-dimensional electron gas near integer fillings and fractions such as 1/5 and 1/7,</td>
<td>Phys. Stat. Sol. (b)</td>
<td>242</td>
<td>1817-1819</td>
<td>John Wiley &amp; Sons, Inc.</td>
<td></td>
</tr>
</tbody>
</table>

**Part 2: Structure, forces and electronic correlation functions in liquid metals**

**Part 2a. Nuclear structure factor and pair potentials in some sp liquid metals**

<table>
<thead>
<tr>
<th>Reference</th>
<th>Authors</th>
<th>Title</th>
<th>Journal</th>
<th>Volume/Issue</th>
<th>Pages</th>
<th>Publisher</th>
<th>Copyright Permission</th>
</tr>
</thead>
</table>


© Copyright permission paid to the American Physical Society on 2009-01-02.

© Copyright permission obtained from Taylor & Francis.

© Copyright permission paid to the American Physical Society on 2009-01-02.

© Copyright permission obtained from Taylor & Francis.

© Copyright permission paid to the American Physical Society on 2009-01-02.

© Copyright permission obtained from Taylor & Francis.

© Copyright permission obtained from Taylor & Francis.
Part 2b. Electronic correlation functions in liquid metals

[1] N. H. March and M. P. Tosi,
Quantum theory of pure liquid metals as two-component systems,
© Copyright permission obtained by Elsevier.

Small-angle scattering from liquid metals and alloys and electronic correlation functions,
© Copyright permission obtained from Società Italiana di Fisica.

*Electron correlation functions in liquids from scattering data,*
© Copyright permission to be obtained from NRC Research Press.


*Electron-electron pair correlation function in solid and molten nearly-free electron metals,*
© Copyright permission obtained from IoP on 2008-09-24.


*Electron scattering by molten aluminium,*
© Copyright permission obtained from Taylor & Francis.


*A diffraction study of the structure of liquid potassium near freezing and density functional theory of pair potentials,*
© Copyright permission obtained from Taylor & Francis.

[7] N. H. March,

*Electronic correlation functions in liquid metals,*
© Copyright permission obtained from Taylor & Francis.

[8] N. H. March,

*Local coordination, electronic correlations and relation between thermodynamic and transport properties of sp liquid metals,*
© Copyright permission obtained by Elsevier.

[9] F. E. Leys, N. H. March, and D. Lamoen,

*Thermodynamic consistency and integral equations for the liquid structure,*
© Copyright permission obtained from the American Institute of Physics.
Part 3: One-body potential theory of molecules and condensed matter

Part 3a. Thomas-Fermi semiclassical approximation

[1] N. H. March,
_Theoretical determination of the electron distribution in benzene by the Thomas–Fermi and the molecular–orbital methods_,
© Copyright permission obtained by IUCr.

[2] N. H. March,
_Thomas–Fermi fields for molecules with tetrahedral and octahedral symmetry_,
© Copyright permission implicitly obtained from Cambridge University Press.

[3] N. H. March and J. S. Plaskett,
_The relation between the Wentzel–Kramers–Brillouin and the Thomas–Fermi approximations_,
© Copyright permission obtained by The Royal Society.

[4] N. H. March and R. J. White,
_Non-relativistic theory of atomic and ionic binding energies for large atomic number_,
© Copyright permission obtained from IoP on 2008-09-24.
[5] N. H. March,
Relation between the total energy and eigenvalue sum for neutral atoms and molecules,
© Copyright permission obtained from the American Institute of Physics.

[6] G. P. Lawes and N. H. March,
Exact local density method for linear harmonic oscillator,
© Copyright permission obtained from the American Institute of Physics.

Chemical potential, Teller's theorem and the scaling of atomic and molecular energies,
© Copyright permission obtained from Prof. R. G. Parr (PNAS does not hold copyright any longer).

[8] N. H. March,
Inhomogeneous electron gas theory of molecular dissociation energies,
© Copyright permission obtained from IoP on 2008-09-24.

On the adiabatic connection method, and scaling of electron–electron interactions in the Thomas–Fermi limit,
© Copyright permission obtained from the American Institute of Physics.

[10] C. Amovilli and N. H. March,
Two-dimensional electrostatic analog of the March model of C_{60} with a semiquantitative application to planar ring clusters,
© Copyright permission paid to the American Physical Society on 2009-01-02.
Part 3b. Transcending Thomas–Fermi theory

[1] N. H. March and W. H. Young,
*Approximate solutions of the density matrix equation for a local average field*,
© Copyright permission obtained by Elsevier.

[2] N. H. March and A. M. Murray,
*Relation between Dirac and canonical density matrices, with applications to imperfections in metals*,
© Copyright permission paid to the American Physical Society on 2009-01-02.

*Electron theory of interaction between point defects in metals*,
Phil. Mag. 6, 1285–1296 (1961).
© Copyright permission obtained from Taylor & Francis.

*Exact Thomas–Fermi method in perturbation theory*,
© Copyright permission obtained by The Royal Society.

[5] N. H. March,
*Differential equation for the ground-state density in finite and extended inhomogeneous electron gases*,
© Copyright permission obtained by Elsevier.

[6] N. H. March,
*Spatially dependent generalization of Kato’s theorem for atomic closed shells in a bare Coulomb field*,
© Copyright permission paid to the American Physical Society on 2009-01-02.

[7] N. H. March,
*The local potential determining the square root of the ground-state electron density of atoms and molecules from the Schrödinger equation*,
© Copyright permission obtained by Elsevier.
[8] H. Lehmann and N. H. March,
*Differential equation for Slater sum in an inhomogeneous electron liquid,*
© Copyright permission obtained from Taylor & Francis.

*Bound-state plus continuum electron densities, and Slater sum, in a bare Coulomb field,*
© Copyright permission requested from Springer on 2008-08-18.

[10] A. Holas and N. H. March,
*Exact exchange-correlation potential and approximate exchange potential in terms of density matrices,*
© Copyright permission paid to the American Physical Society on 2009-01-02.

*Line-integral formulas for exchange and correlation potentials separately,*
© Copyright permission paid to the American Physical Society on 2009-01-02.

[12] A. Holas and N. H. March,
*Potential-locality constraint in determining an idempotent density matrix from diffraction experiment,*
© Copyright permission paid to the American Physical Society on 2009-01-02.

[13] A. Holas and N. H. March,
*Field dependence of the energy of a molecule in a magnetic field,*
© Copyright permission paid to the American Physical Society on 2009-01-02.


[22] N. H. March and I. A. Howard, 

[23] I. A. Howard, N. H. March, and P. W. Ayers, 

[24] I. A. Howard and N. H. March, 


[26] C. Amovilli and N. H. March, 

[27] I. A. Howard and N. H. March, 
Part 3c. Applications of one-body potential theory: Local and nonlocal


[7] K. A. Dawson and N. H. March,  
*The density matrix, density and Fermi hole in Hartree–Fock theory,*  
© Copyright permission obtained from the American Institute of Physics.

[8] N. H. March,  
*Asymptotic formula far from nucleus for exchange energy density in Hartree–Fock theory of closed shell atoms,*  
© Copyright permission paid to the American Physical Society on 2009-01-02.

[9] C. Amovilli and N. H. March,  
*Slater sum and kinetic energy tensor in some simple inhomogeneous electron liquids,*  
© Copyright permission obtained from Taylor & Francis.

[10] A. Holas and N. H. March,  
*Correction to Slater exchange potential to yield exact Kohn–Sham potential generating the Hartree–Fock density,*  
© Copyright permission paid to the American Physical Society on 2009-01-02.

*The March model applied to boron cages,*  
© Copyright permission obtained by Elsevier.

[12] C. Amovilli, I. A. Howard, D. J. Klein, and N. H. March,  
*Dependence of the π-electron eigenvalue sum on the number of atoms in almost spherical C cages,*  
© Copyright permission paid to the American Physical Society on 2009-01-02.

[13] N. H. March,  
*Nonlocal energy density functionals: Models plus some exact general results,*  
© Copyright permission obtained from John Wiley & Sons, Inc.
[14] N. H. March,
*Ground-state geometry and electronic structure of light atom clusters, especially H isotopes, Li, B, and C*,
© Copyright permission obtained from John Wiley & Sons, Inc.

(BeB₂ nanostructures: A density functional study,
© Copyright permission paid to the American Physical Society on 2009-01-02.

[16] C. Amovilli and N. H. March,
*Two-dimensional electrostatic analog of the March model of C₆₀ with a semiquantitative application to planar ring clusters,*
© Copyright permission paid to the American Physical Society on 2009-01-02.

*Molecules in clusters: The case of planar LiBeBCNOF built from a triangular form LiOB and a linear four-center species FBeCN,*
© Copyright permission obtained by Elsevier.