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Chemistry

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Ferromagnetism is associated with the
breaking of time-reversal symmetry,

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most frequently by the spin degree of freedom. Although the orbital motion of electrons ...

~~Imaging orbital ferromagnetism in a
moiré Chern insulator~~

The AB and BA structures have
broken inversion symmetry and exhibit

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an out-of-plane polarization, which can be qualitatively understood by the distortion of the 2p z orbital of the N atoms sitting ...

~~Two-dimensional ferroelectricity by design~~

"The realization of orbital current type

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charge order would require the materials to have both strong interactions and special lattice geometries that were realized only the last few years," said ...

~~Research team discovers unexpected quantum behavior in kagome lattice~~

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This research highlights the importance of orbital excitation in the Co^{3+} ion ... using SHG requires a polar crystal in which inversion symmetry is broken. For this reason, identifying crystals that ...

~~Nonlinear optical crystal changes the~~

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~~color of laser light on the femtosecond
time scale~~

Department of Applied Mathematics
and Theoretical Physics, Centre for
Mathematical Sciences, University of
Cambridge, Wilberforce Road,
Cambridge CB3 0WA, UK We present
a numerical study of convection ...

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~~High-Rayleigh-number convection in
porous fluid layers~~

Eye Position (Midbrain, Pons, Cranial Nerves III, IV, VI) From nuclei in the midbrain and pons, the oculomotor, trochlear, and abducens nerves exit the cranial cavity through the orbital

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~~Diseases of the Brainstem and Cranial
Nerves of the Horse: Relevant
Examination Techniques and
Illustrative Video Segments~~

So what the brain says about a happy
long-term partnership is overlook what

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Derivative Reactions
Chemistry

You don't like and focus on what you do, express empathy for the partner, control your own emotions, have sex with the ...

~~The science of sex, love, attraction,
and obsession~~

"Topological defects" are formed when

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the symmetry of a magnetic material is disrupted. Domain walls (DWs) are a type of topological defect that separates regions of different magnetic orientations.

~~Scientists observe a new type of
topological defect in chiral magnets~~

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The phase stabilization is performed using a collective interferometric measurement method through active phase control and a stochastic parallel gradient descent algorithm. This setup generates a ...

~~Shaping the light: The advent of digital~~

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lasers
But Bozin and colleagues have recently discovered states of local symmetry breaking at high temperature. These local states are associated with electronic orbitals (regions within an atom where ...

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~~Uncovering hidden local states in a
quantum material~~

A metasurface is a planar structure that can control light in a desired manner ... planar nature that has mirror symmetry with respect to its structural plane, the off-diagonal elements of the Jones ...

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~~Toward the capacity limit of 2D planar
Jones matrix with a single layer
metasurface~~

By controlling nitrogen doping, the Fermi level (E_F) of graphene shifts, and if this shift aligns with the lowest unoccupied molecular orbital (LUMO

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...which is relatively complex, hard to control, ...

~~Ultrasensitive molecular sensor using N-doped graphene through enhanced Raman scattering~~

Traditionally, this sort of research has been done by sending one group of

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Pericyclic Reactions
Chemistry
mice to space for a week or two and then comparing their muscle tissue to a group of control mice that stayed on Earth.

~~ISS Artificial Gravity Study Shows
Promise For Long Duration Spaceflight~~
Students are exposed to a wide range

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of research integrity issues that include TSCA (Toxic Substance Control Act), SOPs (Standard ... frontier molecular orbital theory, pericyclic reactions, ...

~~Chemistry Course Listing~~

"The high-temperature, high-

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crystallographic-symmetry state assumes the presence of orbital degeneracy, but orbital degeneracy may not be energetically favorable," said Bozin. "As we see here ...

~~Uncovering hidden local states in a
quantum material~~

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Such orbital currents can produce unusual quantum ... The magnetic field explicitly breaks time-reversal symmetry. Therefore, their observation shows that the chiral charge order in the kagome ...

~~Team discovers unexpected quantum~~

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~~behavior in kagome lattice~~

Such orbital currents can produce unusual quantum ... The magnetic field explicitly breaks time-reversal symmetry. Therefore, their observation shows that the chiral charge order in the kagome ...

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First published in 1979 as the second edition of a 1972 original, this textbook provides a systematic account of cycloadditions and molecular rearrangements.

The Conservation of Orbital Symmetry

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examines the principle of conservation of orbital symmetry and its use. The central content of the principle was that reactions occur readily when there is congruence between orbital symmetry characteristics of reactants and products, and only with difficulty when that congruence does not

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obtain or to put it more succinctly, orbital symmetry is conserved in concerted reaction. This principle is expected to endure, whatever the language in which it may be couched, or whatever greater precision may be developed in its application and extension. The book opens with a

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Review of the elementary aspects of the molecular orbital theory of bonding. This is followed by separate chapters on correlation diagrams, the conservation of orbital symmetry, theory of electrocyclic reactions, theory of cycloadditions and cycloreversions, and theory of

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sigmatropic reactions. Subsequent chapters deal with group transfers and eliminations; secondary conformational effects in concerted cycloaddition reactions; and generalized selection rules for pericyclic reactions.

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Pericyclic Chemistry: Orbital
Mechanisms and Stereochemistry is a
complete guide to the topic that is
ideal for graduate students, advanced
undergraduate students and
researchers in organic chemistry. An
introduction to molecular orbital theory
and relevant stereochemical concepts

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is provided as background, with all four classes of pericyclic reactions discussed and illustrated with orbital picture representations. Also included are chapters on cycloadditions, the most versatile class, and electrocyclic reactions, sigmatropic rearrangements and group transfer reactions. A

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separate chapter on the construction of correlation diagrams is also included, emphasizing a practical, hands on approach. Author Dipak Kumar Mandal brings over 30 years of teaching experience to the topic and illuminates pericyclic chemistry with a clear and fresh perspective.

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Comprehensive guide featuring
unifying mechanistic approaches,
stereochemical details and novel rules
and mnemonics to delineate product
stereochemistry Includes two
background chapters on molecular
orbitals and stereochemical concepts
Emphasizes a theoretical

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Understanding using perturbation theory (Salem-Klopman equation) and physical insights from orbital and state correlation analyses

Orbital symmetry theory has had some notable successes in the analysis of individual organic

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Reactions and in correlations between reaction series. Generalized the theory has been invoked to explain known chemical phenomena, and rather infrequently [? broad-based predictions. In 1965 Woodward and Hoffmann published a series of papers on the orbital inter

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pretation of various types of concerted cycloaddition reactions, which hitherto had rather been understood. Because these processes (now known as pericyclic reactions) had great synthetic importance, and because the Woodward-Hoffmann theory was stated so explicitly as to

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allow [??] useful and far-reaching predictions to?? made, the general acceptance of the so-called Woodward-Hoffmann Rules was very rapid. Judging from the vast number of publications that have appeared,? great deal of experimental effort has???? channelled into this general

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Area since that time, the results of which provide? vindication of the ru1es. The theoretica1 basis of Woodward and Hoffmann's method has, however,???? the subject of criticism and controversy, and?????? of alternative theoretica1 methods have a1so appeared.???? university

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Departments (including your own) have for some time covered pericyclic reactions in their undergraduate and graduate courses. Because aims, teaching methods, and personal preferences differ widely, each of the various theoretical methods have achieved some currency. We have

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Sought to?1??? these methods in
some sort of perspective. The book is
intended to?? introductory, being
aimed primarily at fina1 year
undergraduates and first year
postgraduates.

Pericyclic Reactions: A Mechanistic

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and Problem-Solving Approach
provides complete and systematic
coverage of pericyclic reactions for
researchers and graduate students in
organic chemistry and pharmacy
programs. Drawing from their
cumulative years of teaching in the
area, the authors use a clear, problem-

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Solving approach, supplemented with colorful figures and illustrative examples. Written in an accessible and engaging manner, this book covers electrocyclic reactions, sigmatropic reactions, cycloaddition reactions, 1,3-dipolar reactions, group transfer, and ene reactions. It offers an

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in-depth study of the basic principles of these topics, and devotes equal time to problems and their solutions to further explore those principles and aid reader understanding. Additional practice problems are provided for further study and course use.

Comprehensive coverage of important

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topics such as 1,3 dipolar, pyrolytic,
and cycloaddition reactions Problem-
solving approach with clear figures
and many worked and unworked
problems Contents are applicable to
advanced students and researchers in
organic chemistry

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The mathematical fundamentals of molecular symmetry and group theory are comprehensibly described in this book. Applications are given in context of electronic and vibrational spectroscopy as well as chemical reactions following orbital symmetry rules. Exercises and examples

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Pericyclic Reactions
Chemistry

compile and deepen the content in a
lucid manner.

Pericyclic Reactions, Volume 35-II
covers the theoretical approaches to
pericyclic reactions and reviews of
pericyclic reactions of reactive
intermediates and of particular

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Reaction types. The book discusses some of the experimental approaches used to establish the authenticity of an apparent pericyclic reaction; the transient and observable carbocation rearrangements; and orbital symmetry interactions which are π -extra stabilizing or destabilizing. The text then

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describes the pericyclic reactions of cumulenes; the cheletropic reactions; the applications of frontier molecular orbital theory to pericyclic reactions. A general theoretical model accommodating concerted reaction profiles for forbidden thermal reactions is also encompassed. Chemists and

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people involved in the study of
pericyclic reactions will find the book
invaluable.

Introduction what is organic chemistry
all about?; Structural organic
chemistry the shapes of molecules
functional groups; Organic

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nomenclature; Alkanes;

Stereoisomerism of organic molecules;

Bonding in organic molecules atomic-orbital models; More on nomenclature compounds other than hydrocarbons;

Nucleophilic substitution and elimination reactions; Separation and purification identification of organic

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Compounds by spectroscopic techniques; Alkenes and alkynes. Ionic and radical addition reactions; Alkenes and alkynes; Oxidation and reduction reactions; Acidity or alkynes.

This volume follows the successful book, which has helped to introduce

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and spread the Philosophy of
Chemistry to a wider audience of
philosophers, historians, science
educators as well as chemists,
physicists and biologists. The
introduction summarizes the way in
which the field has developed in the
ten years since the previous volume

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was conceived and introduces several new authors who did not contribute to the first edition. The editors are well placed to assemble this book, as they are the editor in chief and deputy editors of the leading academic journal in the field, *Foundations of Chemistry*. The philosophy of chemistry remains a

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great deal to redress this imbalance.

Among the themes covered is the question of reduction of chemistry to physics, the reduction of biology to chemistry, whether true chemical laws exist and causality in chemistry. In addition more general questions of the nature of organic chemistry,

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biochemistry and chemical synthesis
are examined by specialist in these
areas.

This book provides a concise
introduction to pericyclic and
photochemical reactions for organic
synthesis. In the first part about

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pericyclic reactions, the author explains electrocyclic reactions, cycloaddition reactions, sigmatropic rearrangements, and group transfer reactions. The second part on photochemistry is dedicated to photochemical reactions of a variety of compound classes, including alkenes,

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dienes, and polyenes, carbonyl compounds, and aromatic compounds. Additionally, photofragmentation reactions are described in a dedicated chapter. The last chapter gives an outlook on applications of photochemistry and natural photochemical phenomena. Both parts

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start with a comprehensive presentation of the general principles of the pericyclic and photochemical reactions. All chapters are rich in examples, which help illustrate the explained principles and establish ties to results and trends in recent research. Additionally, each chapter

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Pericyclic Reactions offers exercises for students, and solutions to the problems are provided in a separate appendix. This book nicely illustrates the utility of pericyclic and photochemical reactions and provides students and researchers with the tools to apply them routinely for an efficient synthesis of complex

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Organic molecules. It will therefore appeal to advanced undergraduate students, graduate and postgraduate students, and even to practitioners and scientists in the field of organic synthesis. The rich examples and exercises will also make it a versatile tool for teachers and lecturers.

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