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They're Watching You! | The History of the Illuminati*What Does a 4D Ball Look Like in Real Life? Amazing Experiment Shows Spherical Version of Tesseract* ~~Louise Hay - Heal Your Body~~ How to \"melt\" stones sound, p.1. How to squeeze electricity out of crystals - Ashwini Bharathula *USE THIS for the Max Lens Mod + HERO 10: New GoPro Beta Firmware* Joe Serio, the only American who worked inside the Soviet Secret Police | PODCAST | Profiling Evil ~~5 Physics Books You Should Read (Popular Science + Textbook Recommendations)~~ **How do crystals work? - Graham Baird Book Unhaul Journey BYE BYE BOOKS! | 60 + Books** end of the year book tag?? // 2021 *America's Book Of Secrets: DARPA's Secret Mind Control Technology (Season 4) | History* **Physics And Technology Of Crystalline**

It's not exactly lightning in a bottle, but University of Toronto theoretical physics professor's Dr. Sajeev John's lifework is something close.

U of T theoretical physicist honoured for work on light-trapping technology

UC Berkeley physicist Norman Yao first described five years ago how to make a time crystal—a new form of matter whose patterns repeat in time instead of space. Unlike crystals of emerald or ruby, ...

Using new quantum computing architectures to create time crystals

This opens up new possibilities for exploiting non-equilibrium quantum mechanics in novel nano-engineering applications. Recreating Discrete Time Crystals. In equilibrium, many-bo ...

Discrete Time Crystals Form Basis for Programmable Quantum Simulator

Researchers from the University of Tsukuba and Aarhus University have observed one-dimensional diffusion of indium ions in a proposed thermoelectric material. This phenomenon has been hypothesized for ...

Characterizing the crystal maze: Advances in simple crystals for thermoelectric technology

MIT physicists and colleagues have demonstrated an exotic form of superconductivity in a new material the team synthesized only about a year ago. Although predicted in the 1960s, until now this type ...

New material could be two superconductors in one

A landmark report describes the first structural characterization of a californium—carbon bond. The detailed study of a class of organometallic compounds known as the metallocenes has driven crucial ...

Californium–carbon bond captured in a complex

A team of researchers from China and the United States has recreated gapless superconducting quasiparticles on fragmented Fermi surfaces of bismuth telluride (Bi2Te3) thin films. An in-plane magnetic ...

Cooper Pair Induced Quasiparticles Form Gapless Superconductor

Until now, observing subatomic structures was beyond the resolution capabilities of direct imaging methods, and this seemed unlikely to change. Czech scientists, however, have presented a method with ...

First Observation of Inhomogeneous Electron Charge Distribution on an Atom

Thousands of kilometers under Earth's surface, under crushing pressures and scorching temperatures, the core of the planet can be found. There, an inner core consisting of a solid ball of nickel and ...

The Intense Pressurized Conditions of Earth's Outer Core Have Been Recreated in a Lab

The discovery of such a force could potentially resolve some of the biggest open questions in physics today ... National Institute of Standards and Technology (NIST) is offering fresh hints ...

New Universal Force Tested by Blasting Neutrons through Crystal

AZoNano speaks to Dr. John Miao about his involvement in the breakthrough research that could rewrite our understanding of how substances are formed at an atomic level. Using an innovative atomic ...

Breakthrough for Atomic Arrangement of Amorphous Materials

As a matter of fact, any note can cause the glass to vibrate. A loud note can cause the glass to suddenly shatter if sang loudly enough. Table of contents 1. How can opera singers shatter glass ...

How Can An Opera Singer Shatter Glass?

Andrey Krayev is the US AFM-Raman Product Manager at HORIBA Scientific. Andrey Krayev received his master's degree from the Moscow Institute of Physics and Technology, in 1991. In 2001, he started to ...

Raman and PL at the nanoscale: why it's important for 2D materials

It turned out that the liquid crystal microcavity led to the ... in collaboration with the Military University of Technology, the Institute of Physics of the Polish Academy of Sciences and the ...

The optical Stern–Gerlach Deflection and Young's experiment in the reciprocal space

and Moscow Institute of Physics and Technology (MIPT) Artem Oganov defined the crystal structure and chemical composition of sodium boride, with its properties being the issue of debate for a ...

Global scientific team uncovers crystal structure of sodium boride

Microscopic aspects of ferroelectricity are canonically related to polar atomic displacements that break inversion symmetry of the crystal ... from Tokyo Institute of Technology(Tokyo Tech ...

Revising a generalized spin current theory for the magnetoelectric effect in multiferroics

The study was published in Materials Chemistry and Physics. Silicon carbide is an exceedingly hard, synthetically produced crystalline compound of silicon and carbon. It occurs in nature as the ...

National University of Science and Technology MISiS: NUST MISIS Scientists Come Up With Innovative Method for Silicon Carbide Synthesis

Faculty say the University should prioritize the GW community's concerns about shared governance before strategic planning.

Officials should prioritize immediate issues before strategic planning, faculty say

UC Berkeley physicist Norman Yao first described five years ago how to make a time crystal — a new form of matter whose patterns repeat in time instead of space. Unlike crystals of emerald or ruby, ...

Creating Time Crystals Using New Quantum Computing Architectures

The demonstration of finite momentum superconductivity in a layered crystal known a natural superlattice means ... "An important theme of our research is that new physics comes from new materials," ...

Electronic devices based on oxide semiconductors are the focus of much attention, with crystalline materials generating huge commercial success. Indium-gallium-zinc oxide (IGZO) transistors have a higher mobility than amorphous silicon transistors, and an extremely low off-state current. C-axis aligned crystalline (CAAC) IGZO enables aggressive down-scaling, high reliability, and process simplification of transistors in displays and LSI devices. This original book introduces the CAAC-IGZO structure, and describes the physics and technology of this new class of oxide materials. It explains the crystallographic classification and characteristics of crystalline oxide semiconductors, their crystallographic characteristics and physical properties, and how this unique material has made a major contribution to the field of oxide semiconductor thin films. Two further books in this series describe applications of CAAC-IGZO in flat-panel displays and LSI devices. Key features: Introduces the unique and revolutionary, yet relatively unknown crystalline oxide semiconductor CAAC-IGZO Presents crystallographic overviews of IGZO and related compounds. Offers an in-depth understanding of CAAC-IGZO. Explains the fabrication method of CAAC-IGZO thin films. Presents the physical properties and latest data to support high-reliability crystalline IGZO based on hands-on experience. Describes the manufacturing process the CAAC-IGZO transistors and introduces the device application using CAAC-IGZO.

This book highlights the display applications of c-axis aligned crystalline indium-gallium-zinc oxide (CAAC-IGZO), a new class of oxide material that challenges the dominance of silicon in the field of thin film semiconductor devices. It is an enabler for displays with high resolution and low power consumption, as well as high-productivity manufacturing. The applications of CAAC-IGZO focus on liquid crystal displays (LCDs) with extremely low power consumption for mobile applications, and high-resolution and flexible organic light-emitting diode (OLED) displays, and present a large number of prototypes developed at the Semiconductor Energy Laboratory. In particular, the description of LCDs includes how CAAC-IGZO enables LCDs with extremely low refresh rate that provides ultra-low power consumption in a wide range of use cases. Moreover, this book also offers the latest data of IGZO. The IGZO has recently achieved a mobility of 65.5 cm2?}V-s, and it is expected to potentially exceed 100 cm2?}V-s as high as that of LTPS. A further two books in the series will describe the fundamentals of CAAC-IGZO, and the application to LSI devices. Key features: • Introduces different oxide semiconductor field-effect transistor designs and their impact on the reliability and performance of LCDs and OLED displays, both in pixel and panel-integrated driving circuits. • Reviews fundamentals and presents device architectures for high-performance and flexible OLED displays, their circuit designs, and oxide semiconductors as an enabling technology. • Explains how oxide semiconductor thin-film transistors drastically can improve resolution and lower power consumption of LCDs.

This book describes the application of c-axis aligned crystalline In-Ga-Zn oxide (CAAC-IGZO) technology in large-scale integration (LSI) circuits. The applications include Non-volatile Oxide Semiconductor Random Access Memory (NOSRAM), Dynamic Oxide Semiconductor Random Access Memory (DOSRAM), central processing unit (CPU), field-programmable gate array (FPGA), image sensors, and etc. The book also covers the device physics (e.g., off-state characteristics) of the CAAC-IGZO field effect transistors (FETs) and process technology for a hybrid structure of CAAC-IGZO and Si FETs. It explains an extremely low off-state current technology utilized in the LSI circuits, demonstrating reduced power consumption in LSI prototypes fabricated by the hybrid process. A further two books in the series will describe the fundamentals; and the specific application of CAAC-IGZO to LCD and OLED displays. Key features: • Outlines the physics and characteristics of CAAC-IGZO FETs that contribute to favorable operations of LSI devices. • Explains the application of CAAC-IGZO to LSI devices, highlighting attributes including low off-state current, low power consumption, and excellent charge retention. • Describes the NOSRAM, DOSRAM, CPU, FPGA, image sensors, and etc., referring to prototype chips fabricated by a hybrid process of CAAC-IGZO and Si FETs.

Today's solar cell multi-GW market is dominated by crystalline silicon (c-Si) wafer technology, however new cell concepts are entering the market. One very promising solar cell design to answer these needs is the silicon hetero-junction solar cell, of which the emitter and back surface field are basically produced by a low temperature growth of ultra-thin layers of amorphous silicon. In this design, amorphous silicon (a-Si:H) constitutes both „emitter" and „base-contact/back surface field" on both sides of a thin crystalline silicon wafer-base (c-Si) where the electrons and holes are photogenerated; at the same time, a-Si:H passivates the c-Si surface. Recently, cell efficiencies above 23% have been demonstrated for such solar cells. In this book, the editors present an overview of the state-of-the-art in physics and technology of amorphous-crystalline heterostructure silicon solar cells. The heterojunction concept is introduced, processes and resulting properties of the materials used in the cell and their heterointerfaces are discussed and characterization techniques and simulation tools are presented.

This introduction to the physics of silicon solar cells focuses on thin cells, while reviewing and discussing the current status of the important technology. An analysis of the spectral quantum efficiency of thin solar cells is given as well as a full set of analytical models. This is the first comprehensive treatment of light trapping techniques for the enhancement of the optical absorption in thin silicon films.

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For much of the past 60 years, the U.S. research community dominated the discovery of new crystalline materials and the growth of large single crystals, placing the country at the forefront of fundamental advances in condensed-matter sciences and fueling the development of many of the new technologies at the core of U.S. economic growth. The opportunities offered by future developments in this field remain as promising as the achievements of the past. However, the past 20 years have seen a substantial deterioration in the United States' capability to pursue those opportunities at a time when several European and Asian countries have significantly increased investments in developing their own capacities in these areas. This book seeks both to set out the challenges and opportunities facing those who discover new crystalline materials and grow large crystals and to chart a way for the United States to reinvigorate its efforts and thereby return to a position of leadership in this field.

The aim of the work is give an overview of the activity in the field of Photonic Crystal developed in the frame of COST P11 action . The main objective of the COST P11 action was to unify and coordinate national efforts aimed at studying linear and nonlinear optical interactions with Photonic Crystals (PCs), without neglecting an important aspect related to the material research as idea and methods of realizations of 3D PC, together with the development and implementation of measurement techniques for the experimental evaluation of their potential applications in different area, as for example telecommunication with novel optical fibers, lasers, nonlinear multi-functionality, display devices, opto-electronics, sensors. The book contains contributions from authors who gave their lecture at the Cost P11 Training School.

Photoalignment possesses significant advantages in comparison with the usual ‘rubbing’ treatment of the substrates of liquid crystal display (LCD) cells as it is a non-contact method with a high resolution. A new technique recently pioneered by the authors of this book, namely the photo-induced diffusion reorientation of azodyes, does not involve any photochemical or structural transformations of the molecules. This results in photoaligning films which are robust and possess good aligning properties making them particularly suitable for the new generation of liquid crystal devices. Photoalignment of Liquid Crystalline Materials covers state-of-the-art techniques and key applications, as well as the authors’ own diffusion model for photoalignment. The book aims to stimulate new research and development in the field of liquid crystalline photoalignment and in so doing, enable the technology to be used in large scale LCD production. Key features: Provides a full examination of the mechanisms of photoalignment. Examines the properties of liquid crystals during photoalignment, with particular reference made to the effect on their chemical structure and stability. Considers the most useful photosensitive materials and preparation procedures suitable for liquid crystalline photoalignment. Presents several methods for photoalignment of liquid crystals. Compares various applications of photoalignment technology for in-cell patterned polarizers and phase retarders, transflective and micro displays, security and other liquid crystal devices. Through its interdisciplinary approach, this book is aimed at a wide range of practising electrical engineers, optical engineers, display technologists, materials scientists, physicists and chemists working on the development of liquid crystal devices. It will also appeal to researchers and graduate students taking courses on liquid crystals or display technologies. The Society for Information Display (SID) is an international society, which has the aim of encouraging the development of all aspects of the field of information display. Complementary to the aims of the society, the Wiley-SID series is intended to explain the latest developments in information display technology at a professional level. The broad scope of the series addresses all facets of information displays from technical aspects through systems and prototypes to standards and ergonomics