# Open Questions In Electron Cyclotron Wave Theory

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**Open Questions In Electron Cyclotron**

MIT physics professor Richard Milner describes his new book, "The HERMES Experiment," which tells how physicists from Europe and North America created the HERMES experiment, with the goal of studying ...

**3 Questions: Richard Milner on the messier side of physics**

Quantum computers promise great advances in many fields—from cryptography to the simulation of protein folding. Yet, which physical system works best to build the underlying quantum bits is still an ...

**Scientists advance the understanding of potential topological quantum bits**

With the support of a prestigious $542,813 National Science Foundation Faculty Early Career Development (CAREER) grant, physicist Trevor David Rhone is turning to artificial intelligence to help ...

**Harnessing AI To Search for New Materials With Exotic Properties**

CD-1 milestone marks start of project execution phase for next-generation nuclear physics facility that will probe the smallest building blocks of visible matter.

**Electron-Ion Collider Achieves Critical Decision 1 Approval**

A new theory about how plasma works could move scientists closer to the goal of emission-free fusion energy. Plasma is the fourth state of ...

**New insight into how plasma heats up could help optimise fusion reactions**

The words "mushroom" and "stub" denote two

types of dendritic spines, but while their shapes are easy to behold, whatever biochemical differences hide within is a mystery. To explore what goes on ...

**Peering Inside Stubby and Mushroom Dendritic Spines**

Highlights For the first time, scientists have seen stony coral cells engulf dinoflagellates - single-celled, photosynthetic algae that are crucial ...

**Hard to swallow: Coral cells seen engulfing algae for first time**

Scientists from the Nanoelectronics group at the Institute of Science and Technology (IST) Austria were looking for half an electron as a basis for a quantum computer. Together with researchers from ...

**Unfinding a Split Electron**

Charge and energy transport in organic materials and magneto-conductivity in two-dimensional electron gases have been shown to ... such as conductivity or magnetism. One of the open questions is ...

**Manipulating matter by strong coupling to vacuum fields**

Between the stars in our Milky Way, vast amounts of tiny dust grains are floating aimlessly around. They form the building blocks of new stars and planets. But we still don't know what elements ...

**Astronomers map interstellar dust grains in Milky Way**

Similarly, there are six “leptons” which include the electron, a heavier cousin ... One of the biggest open questions in physics today is why is there more matter than antimatter.

**CERN’s LHCb breakthrough will reveal a lot about the universe’s origins**

Still, the moon collider could solve some of the big questions in particle physics ... a megastructure could enable particle acceleration that reaches 14 quadrillion electron volts, or about 1,000 ...

**A Lunar Particle Collider Could Unlock the Greatest Mysteries in Physics**

It is for this reason that new thinking, a forcing open of a horizon of political possibility ... deployed whenever the PA elite feels that its own existence and power is in question. It relies on the ...

**How the Palestinian Authority manages dissent**

Similarly, there are six “leptons” which include the electron, a heavier cousin called the muon ... annihilate in a flash of energy when they meet. One of the biggest open questions in physics today ...

**CERN: How We’re Probing the Universe’s Origins Using Record Precision Measurements**

Researchers at the University of Chicago and Argonne National Laboratory have imaged an entire mouse brain across five orders of magnitude of resolution, a step which researchers say will better ...

**Researchers image an entire mouse brain for the first time**

But consider the cauliflower instead. It takes just two genes to transform the ordinary stems, stalks and flowers of the weedy, tasteless species Brassica oleracea into a formation as marvelous as ...

**Cauliflower and Chaos, Fractals in Every Floret**

As the climate changes, cities must change with it. Fix is exploring how our urban centers are being reimagined and what green, equitable, and resilient communities could look like. With insights from ...

**The cities of 2121: Changemakers envision the future they're working toward**

Scientists have been looking for half an electron as a basis for a quantum computer. They investigated a promising experimental setup just to find that the signals they measured were not telling the ...

These proceedings present the latest results

in electron cyclotron emission, heating and current drive, with an emphasis on the physics and technology of Electron Cyclotron Emission, Electron Cyclotron Heating and Electron Cyclotron Current Drive applied to magnetic fusion research. The field is a key element in the development of fusion power and the ITER project now under construction.

Acknowledged as the "founding father" of and world renowned expert on electron cyclotron resonance sources Richard Geller has produced a unique book devoted to the physics and technicalities of electron cyclotron resonance sources. Electron Cyclotron Resonance Ion Sources and ECR Plasmas provides a primer on electron cyclotron phenomena in ion sour

This proceedings volume, the sixteenth in a biannual series, presents a snapshot of the state of current research worldwide on Electron Cyclotron Emission (ECE) and Electron Cyclotron Resonance Heating (ECRH) and related technologies. The papers address the physics, both theory and experiment, of ECE and ECRH. The technologies of high power millimeter-wave sources ? gyrotrons ? and transmission lines and launchers are included. The focus is on physics and technology relevant to the research and development of nuclear fusion.

Neutrinos continue to be the most mysterious and, arguably, the most fascinating particles of the Standard Model as their intrinsic properties such as absolute mass scale and CP properties are unknown. The open question of the absolute neutrino mass scale will be addressed with unprecedented accuracy by the Karlsruhe Tritium Neutrino (KATRIN) experiment, currently under construction. This thesis focusses on the spectrometer part of KATRIN and background processes therein. Various background sources such as small Penning traps, as well as nuclear decays from single radon atoms are fully characterized here for the first time. Most importantly, however, it was possible to reduce the background in the spectrometer by more than five orders of magnitude by eliminating Penning traps and by developing a completely new background reduction method by stochastically heating trapped electrons using electron cyclotron resonance (ECR). The work beautifully demonstrates that the obstacles and challenges in measuring the absolute mass scale of neutrinos can be met successfully if novel experimental tools (ECR) and novel computing methods (KASSIOPEIA) are combined to allow almost background-free tritium ß-spectroscopy.

In this proceedings, physicists from all over

the world discussed the state-of-the-art in the field of Electron Cyclotron Emission (ECE) and Electron Cyclotron Resonance Heating (ECRH) in great detail. Papers have been presented in the field of millimeter wave technology for ECE and ECRH, theory of propagation and absorption of EC waves in plasmas, EC current drive theory and experiments, nonlinear effects, ECRH sources, transmission line technology, experiments and plans. Comprehensive summaries on the main topics of the EC-10 workshop (theory, diagnostics, experiments, techniques) have been written by world renowned experts. The proceedings is indispensable for anyone who is working in the field of ECE and ECRH.

This book describes the design, physics, and performance of high density plasma sources which have been extensively explored in low pressure plasma processing, such as plasma etching and planarization, plasma enhanced chemical vapor deposition of thin films, sputtered deposition of metals and dielectrics, epitaxial growth of silicon and GaAs, and many other applications. This is a comprehensive survey and a detailed description of most advanced high density plasma sources used in plasma processing. The book is a balanced presentation in that it gives both a theoretical treatment and practical applications. It should be of considerable interest to scientists and engineers working on plasma source design,

and process development.