

科学大讲堂 | KMS Technologies的Kurt M. Strack博士分享地球电磁法的奥秘

科学大讲堂 南方科技大学理学院 6 days ago



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2019年9月2日上午，KMS Technologies- KJT Enterprises Inc. 的Kurt M. Strack博士应邀做客理学院“科学大讲堂”活动，给我校师生分享以“**Using Geo- electromagnetic Methods in a Responsible Way to Support Humanity and Minimize Carbon Footprint**”为题的学术报告，讲座由前沿与交叉科学研究院/地球与空间科学系何展翔教授主持。由于讲座语言为英文，为保证专业术语的准确性，本期科学大讲堂将使用英文进行报道。

Dr. Kurt M. Strack from KMS Technologies- KJT Enterprises Inc. was invited to give a lecture entitled "**Using Geo- electromagnetic Methods in a Responsible Way to Support Humanity and Minimize Carbon Footprint**" in the morning on **Monday, Sep 2, 2019**. Prof. Zhanxiang He from SUSTech Academy for Advanced Interdisciplinary Studies/ the Department of Earth and Space Sciences hosted the lecture. As the lecture was given in English, this news report will be presented in English in order to ensure the accuracy of the terminology.

1 Guest Introduction

Dr. K.M. Strack is **president of KMS Technologies- KJT Enterprises Inc.** The Russian Academy of Science elected him a Foreign Member. Kurt also **serves as Professor at the University of Houston, Mahidol University Bangkok, and at Yangtze University.** He served as Chief Scientist for Baker Atlas. Prior to that Kurt pioneered LOTEM development and advanced borehole geophysics technologies in Germany, Australia and the USA. Kurt received a Ph.D. from the University of Cologne and a M.Sc. from Colorado School of Mines. **Kurt has over 200 publications, 1 textbook & authors/co-authors more than 30 patents. He received a Fulbright scholarship and numerous international grants/awards.**

The SPWLA granted Kurt a **Distinguished Technical Achievement Award in 2003** for new logging technologies. SEG granted him the Reginald Fessenden Award. Kurt was **Distinguished Lecturer** for the SPE (1998-1999) and SPWLA (2004-2005). In 2007-2008 he received **the SEG's**

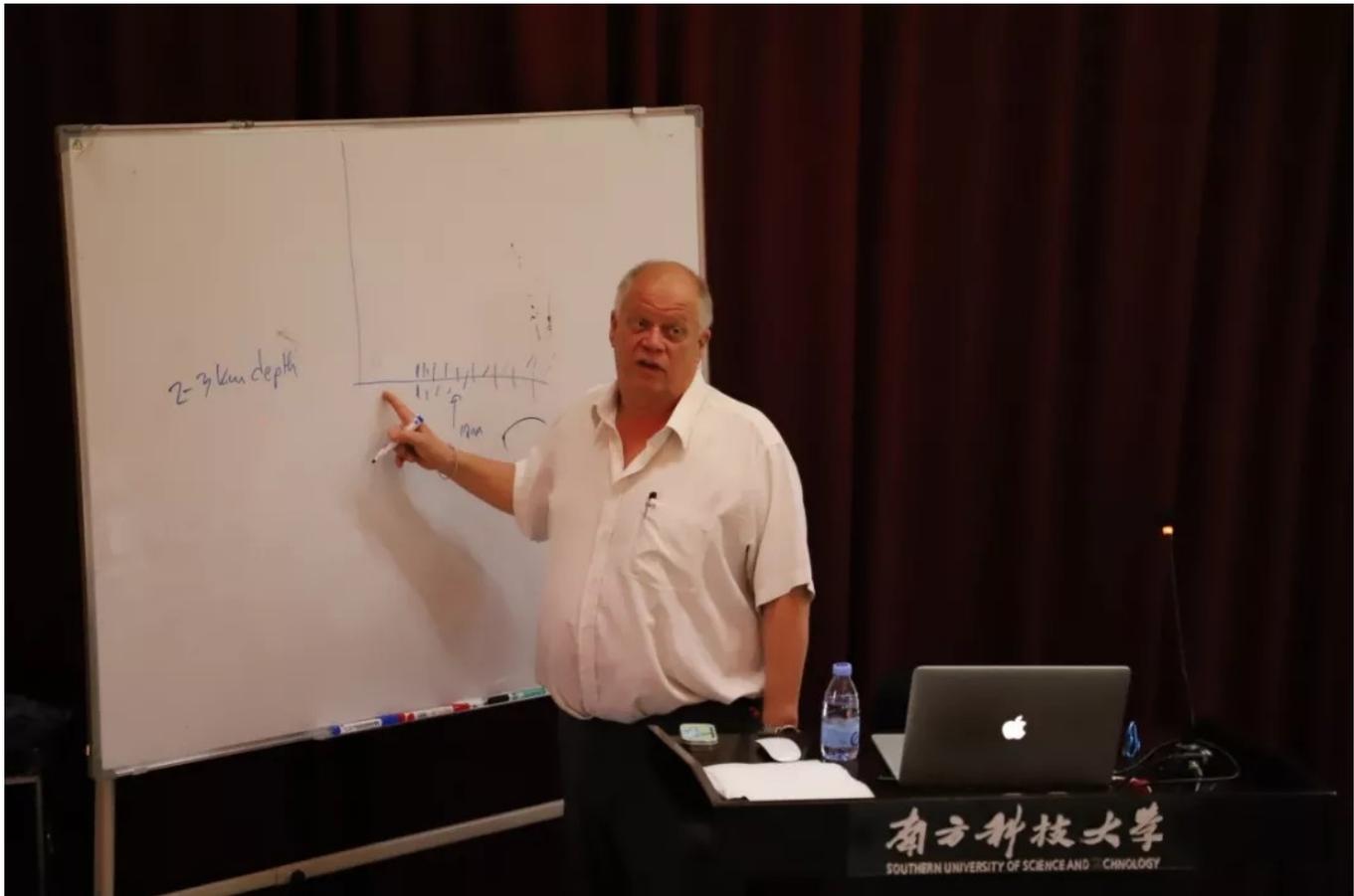
Presidents Special Services Award. 2012 Kurt is co-recipient Cecil H. Green Enterprise Award from the SEG.



Dr. K.M. Strack

2 Lecture Detail

In the lecture, Dr. K.M. Strack firstly **gave the concept of the geophysics**, which is **“a subject of natural science concerned with the physical processes and physical properties of the Earth and its surrounding space environment, and the use of quantitative methods for their analysis”**. He further explained that Geophysics is closely related to human life, contributing to decrease environmental damage and minimize carbon footprint.



In the lecture

Subsequently, he **gave a brief introduction on the research background and some basic geophysical methods**, including gravity, magnetics, sound waves and electricity. He also elaborated on **its application in the field of hydrocarbon exploration and production**, for example, decreasing the risk level of well drilling, discovering residual oil and promoting oil recovery rate, etc.

Besides, **he introduced how Geophysics contribute to the geothermal industry**, for instance, exploring hot fluid zone, monitoring induced seismicity and measuring the temperature change, etc. Similarly, for renewable energy like geothermal and combustible ice, Geoelectromagnetic is the prominent method to find hot areas in the subsurface which is then used for heat production.

Finally, **Dr. K.M. Strack pointed out that the geophysical method is extending reservoir experience to earthquake prediction, and Chinese researchers do some pioneer work in this field**. The earthquake is one of the most severe natural disasters, and its prediction is a worldwide scientific problem. **If the electromagnetic method can be utilized to predict the earthquake, there will have a profound effect on our lives.**

In conclusion, **geophysical methods are not merely the fundamental technology in hydrocarbon exploration, but also have many applications in other fields such as engineering and geothermal application, even in cost saving and environmental protection.**

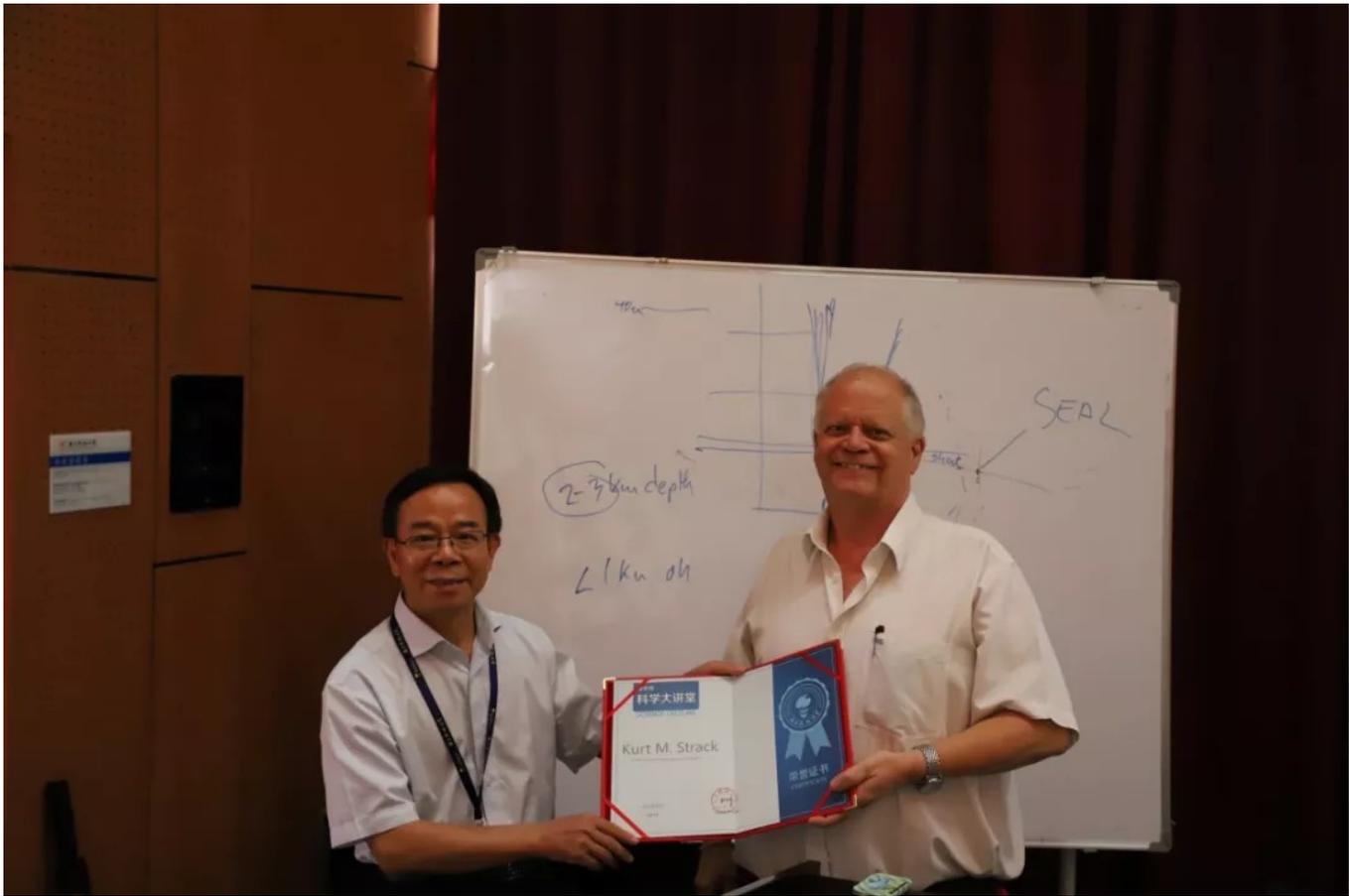
3 Q& A Session

In this Q&A Session, students asked some question regarding **the earthquake prediction and how to find the fracture underground**, and Dr. K.M.Strack gave a detailed answer one by one.



An audience is asking question

In the end of the lecture, Prof. Zhanxiang He on behalf of College of Science presented the honorary certificate to Dr. K.M.Strack to express our great welcome and sincere gratitude.



Prof. Zhanxiang He and Dr. K.M.Strack

4 Next Guest

At the invitation of Zhiping Zheng, Professor Ren-Gen Xiong, a jointly professor by Southeast University and Nanchang University respectively, will give us an academic report entitled "Ferroelectrics Go Chemical Design" on Thursday, September 19, 2019 in Room 111, Lynn Library from 16:00-17:30pm. All faculty members and students are welcome to join us! The lecture will be given in Chinese. For more information, please see the poster below.

科学大讲堂

SCIENCE LECTURE

理学院
College of Science

020 期



Ferroelectrics Go Chemical Design 分子铁电走向化学设计

-  主 讲: 熊仁根 教授
-  时 间: 2019/ 9/19 周四 16: 00-17: 30
-  地 点: 图书馆111报告厅 Room 111, Library
-  邀请人: 郑智平 教授

>>> 嘉宾简介 Introduction

Ren-Gen Xiong is a jointly professor by Southeast University and Nanchang University respectively. He won the National Science Fund for Distinguished Young Scholars in 2002 and was honored for the title of Cheung Kong Scholar Professor in Minister of Education in 2004. Importantly, he was invited to joint a guest editor of PNAS (USA) in 2018. He won the second prize in National Natural Science Award twice in 2004 (rank 2) and 2017(rank 1), respectively. His research has been funded by the National Natural Science Foundation of China such as Integrated Project, key Project and Major project. He has held more than 200 papers as corresponding author in SCI journals, Professor Xiong has been conducting the research focused on acentric compound synthesis and properties, especially in the field of molecular ferroelectrics.

>>> 报告简介 Course Content

During the past 20 years, molecular ferroelectrics have shown great revival. After years of being concentrated on this field, we sum up the "Quasi---Non Spherical theory" (abbreviated as QNS). Thus, compounds with structural phase transitions are induced to the ferroelectric phase by chemical modification. On the other hand, the ferroelectric phase must adopt one of the 10 polar point groups, among which up to five are chiral point groups. We induced chiral compounds to crystallize into five chiral point groups, greatly increasing the probability of its falling in the ferroelectric phase. Recently, we discovered that the substitution of H by an F atom can keep the original point group. Not only it can increase the phase transition temperature and the spontaneous polarization value, but also can introduce a chiral center on the molecule, reaching chiral point group effect. Therefore, we refer to F substituted H as the "H/F substitution" effect (similar to the isotope effect). By the combination of QNS theory, the introduction of chirality and the "H/F substitution" effect, molecular ferroelectrics are rationally designed, creating a new subject "ferroelectrochemistry".



南方科技大学
SOUTHERN UNIVERSITY OF SCIENCE AND TECHNOLOGY

理学院 College of Science

欢迎全体师生参加!



5 Science Quiz

Previous Answer

Q 1 : How plasomic energy is transferred to molecules in reality ?

A 1 : Excited energy is transferred to molecules.

Q 2 : Was heating effect considered in the hot electron transfer model?

A 2 : There was some controversy about this issue. Although some people believe that heating is the major effect that affects the reaction activities, there is experimental evidence that hot electron transfer did happen.



Present Test

Q 1 : How can we deal with the hydrocarbon exploration and drinking water pollution ?

Q 2 : Hydraulic fracturing has caused a lot of controversy in North America, what can geophysical electromagnetics do in environmental governance?

往期精彩

科学大讲堂|美国物理学会会士、香港科技大学陈子亭教授解读新型超材料

科学大讲堂|美国耶鲁大学Shun-ichiro Karato教授诠释新的月球起源：拯救同位素危机科

学大讲堂|教育部长江学者、武汉大学周翔教授分享核酸的分子识别和调控研究

科学大讲堂|罗马第一大学Guido Martinelli教授畅谈粒子物理学中的开放性问题 and 观点

科学大讲堂|中科院院士、应用数学与计算数学专家江松院士阐述偏微分方程的应用、分析与数值科

学大讲堂|曼彻斯特大学David A. Leigh教授揭秘如何制作最小的机器

科学大讲堂 | 加利福尼亚大学Steven Constable教授分享如何使用海洋电磁技术研究板块、石油和永久冻土

科学大讲堂 | 美国西北大学George Schatz教授畅谈量子效应和等离子体光子学



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