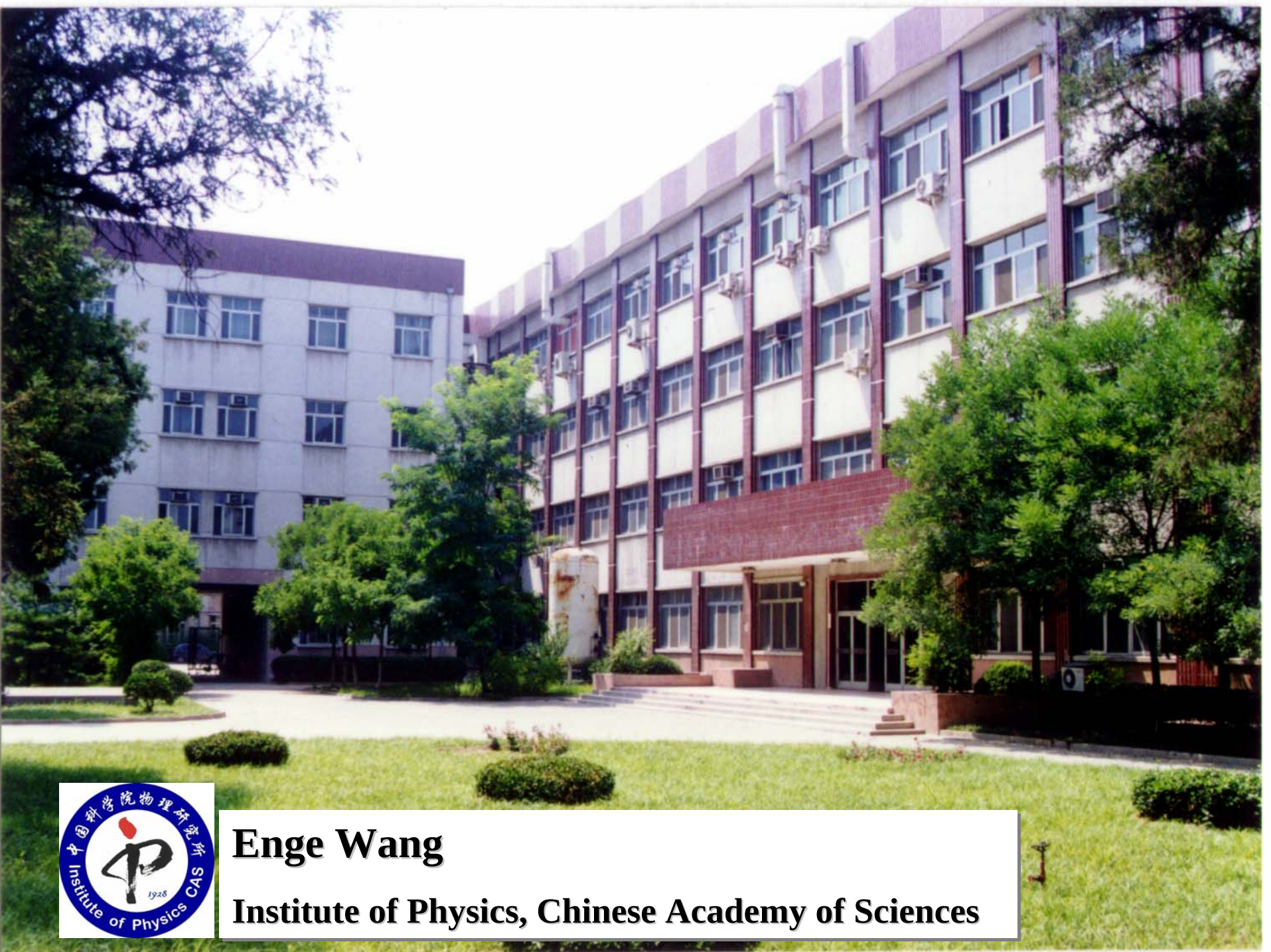
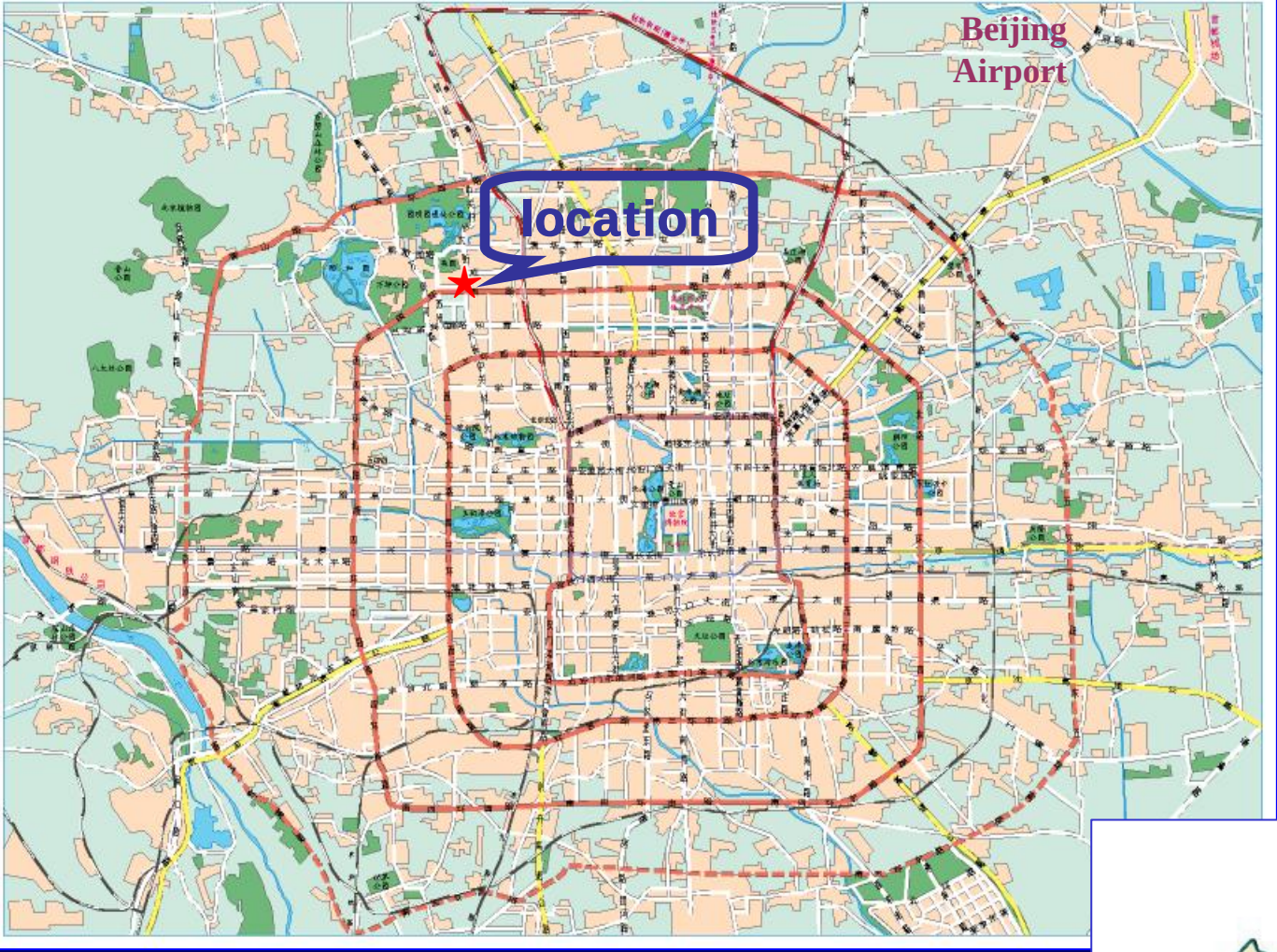


Enge Wang

Institute of Physics, Chinese Academy of Sciences


Beijing
Airport
location

China


Harbin
Shenyang
BEIJING
Ürümqi
Lanzhou
Zhengzhou
Shanghai
Xi'an
Wuhan
Chongqing
Lhasa
Taipei
Guangzhou
Kunming
Hongkong
Haikou


清 华 大 学
北 京 大 学
中 关 村
北 四 环
南 路
铁 路
轨 道
成 府 路
Chinese Academy of Sciences
IPCAS


四 环 路
西 门
清 华 南 路

History of IoP/CAS

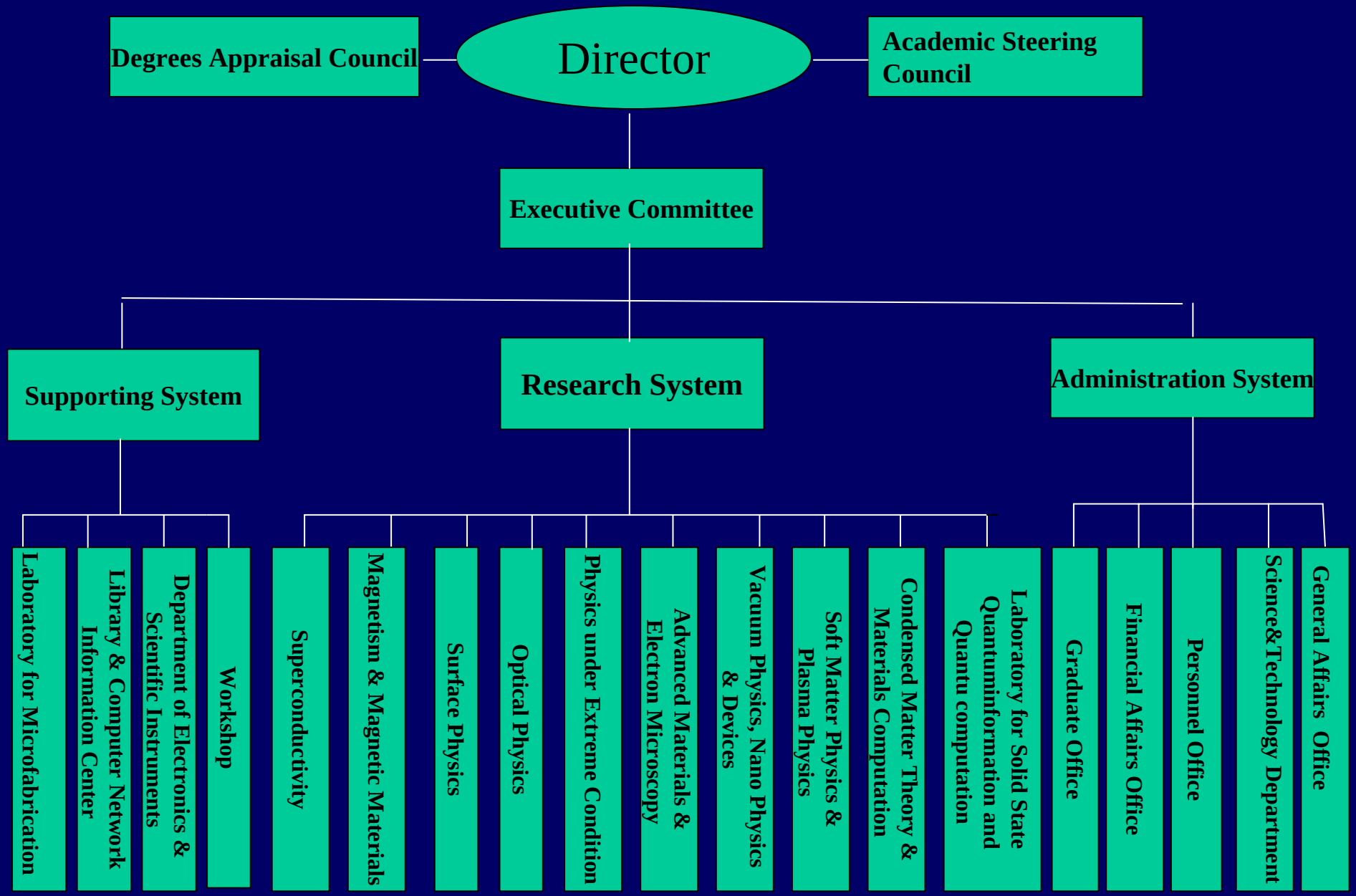
National Research Institute of Physics (1928.3-1950.5)

The Institute of Physics, National Academy of Peking (1929.9-1950.5)

The Institute of Applied Physics CAS (1950)

The Institute of Physics, CAS (1958)

Organization

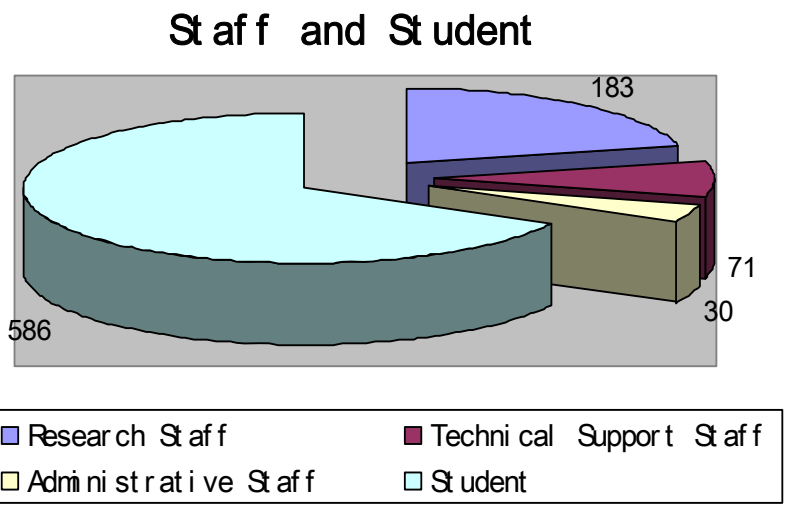


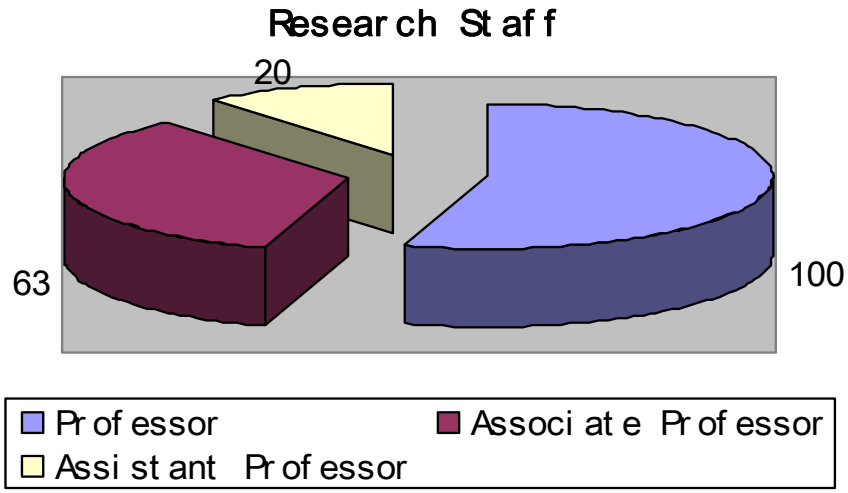
Staffing

Research Staff: 183 **Technical Support Staff: 71**

Students: 586 **Administrative Staff: 30**

Total number: 870





(according to the Statistic by the end of 2004)

Physical Awards by TWAS :

Z. X. Zhao

K. H. Kuo

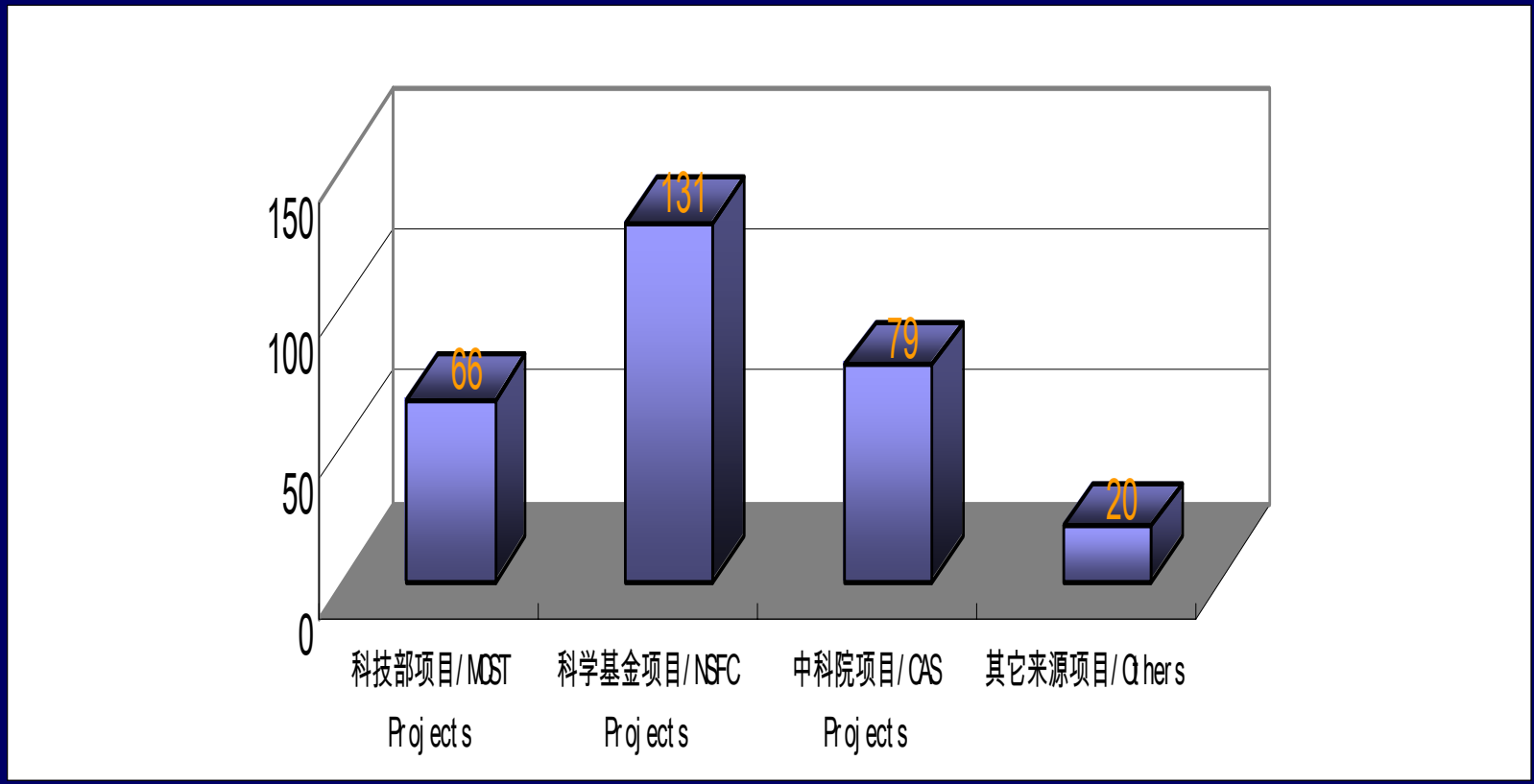
H. F. Fan

15 Academicians

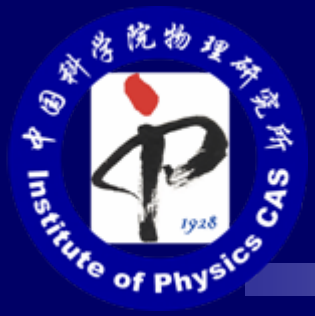
(59 Academicians in history)

Prof. Fang-hua Li at the prize-awarding ceremony

General View on-going Projects



Budget: 1/3 from CAS, 2/3 from competitive founds



Research Areas and Highlights

Main Achievements:

* High Tc oxide superconductors at liquid nitrogen temperatures

* Nd-Fe-B permanent magnetic alloys using low purity materials

* Synthesis of nonlinear crystals

* Study on symmetry and property of quasicrystals

Main Achievements:

* High Tc oxide superconductors at liquid nitrogen temperatures

* Nd-Fe-B permanent magnetic alloys using low purity materials

* Synthesis of nonlinear crystals

* Study on symmetry and property of quasicrystals

San Huan Company

以稀土和非晶态合金基本磁性理论为基础，研制成功钕铁硼磁钢。

三

钕铁

界同

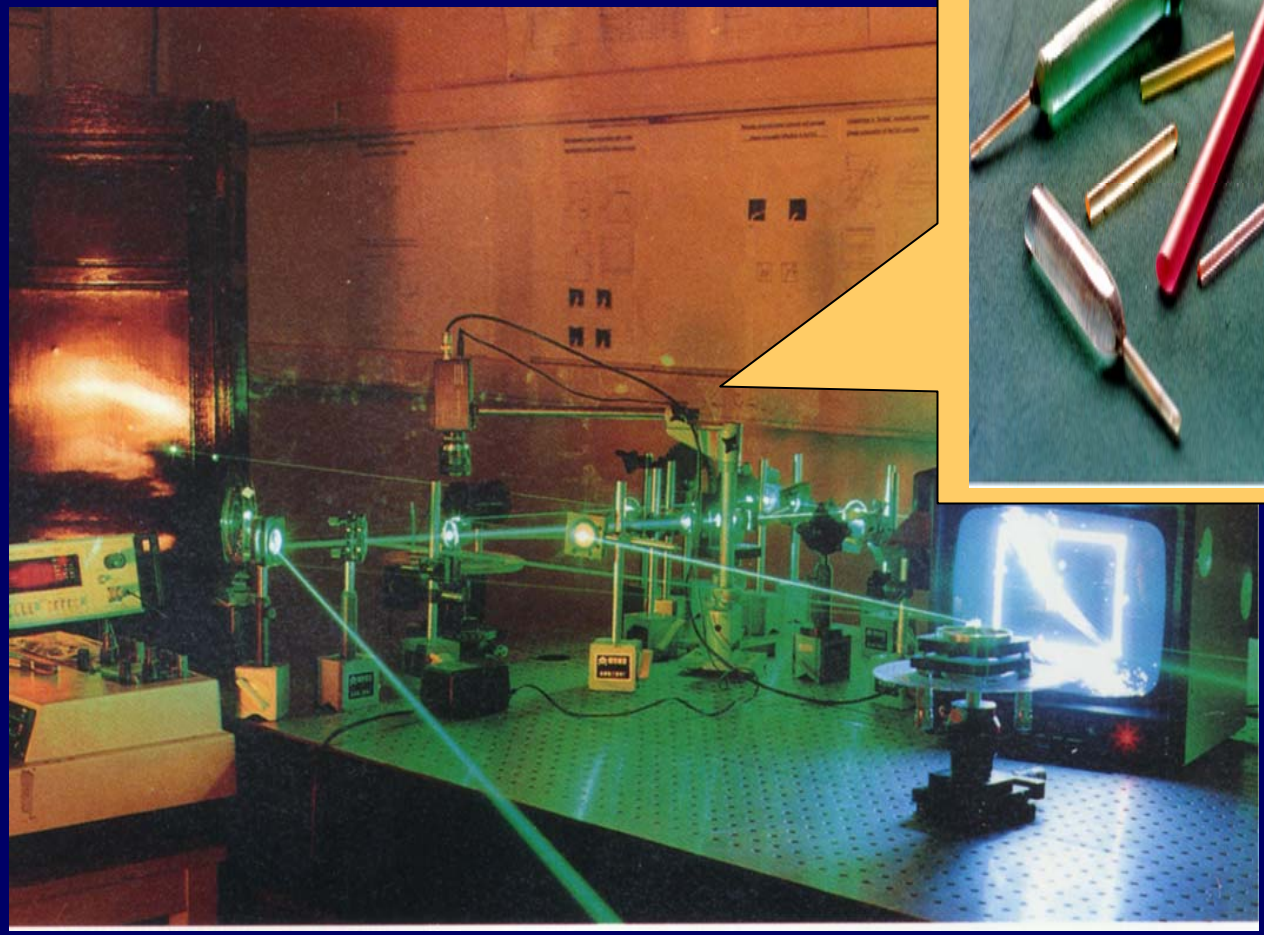
Main Achievements:

* High Tc oxide superconductors at liquid nitrogen temperatures

* Nd-Fe-B permanent magnetic alloys using low purity materials

* Synthesis of nonlinear crystals

* Study on symmetry and property of quasicrystals



Observation of a new mechanism generating self-pumped phase-conjugate reflection in photorefractive crystals

Main Achievements:

* High Tc oxide superconductors at liquid nitrogen temperatures

* Nd-Fe-B permanent magnetic alloys using low purity materials

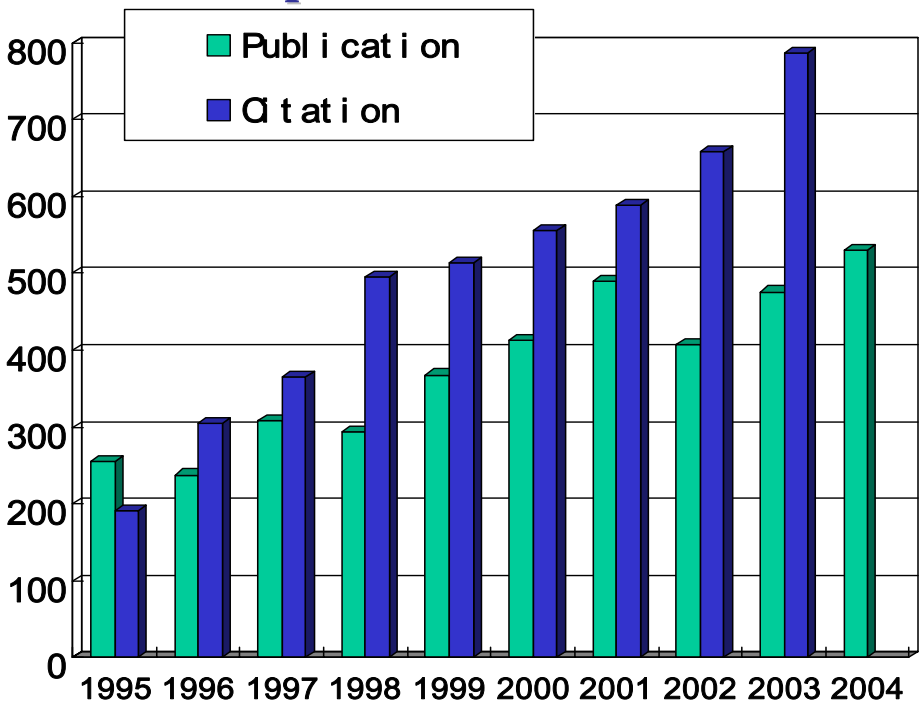
* Synthesis of nonlinear crystals

* Study on symmetry and property of quasicrystals

General View of Publication

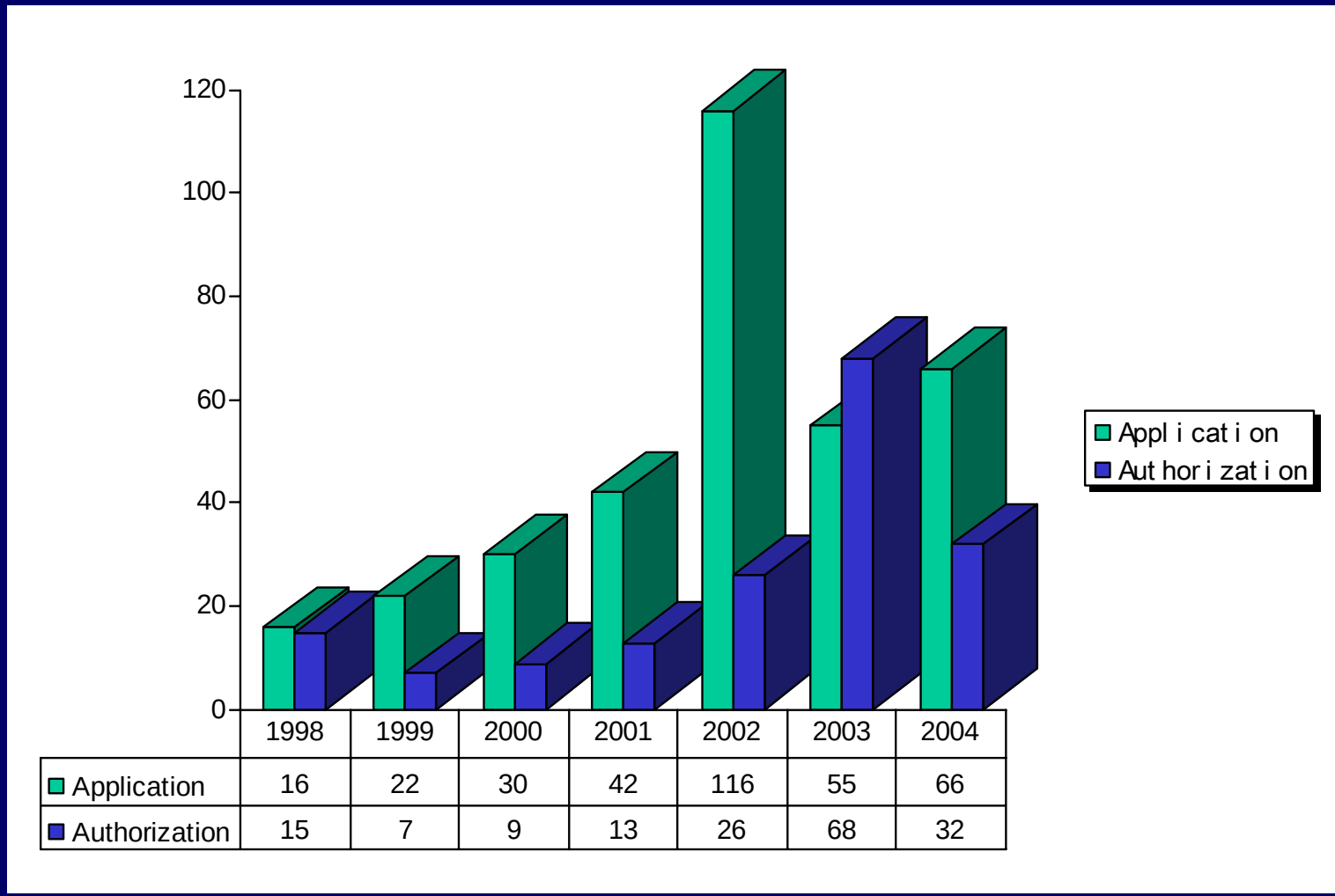
Year	1997	1998	1999	2000	2001	2002	2003	2004
Papers	293	294	337	431	489	407	476	530

The numbers of publication and citation have been ranked at the top in China for more than ten yeas in succession.



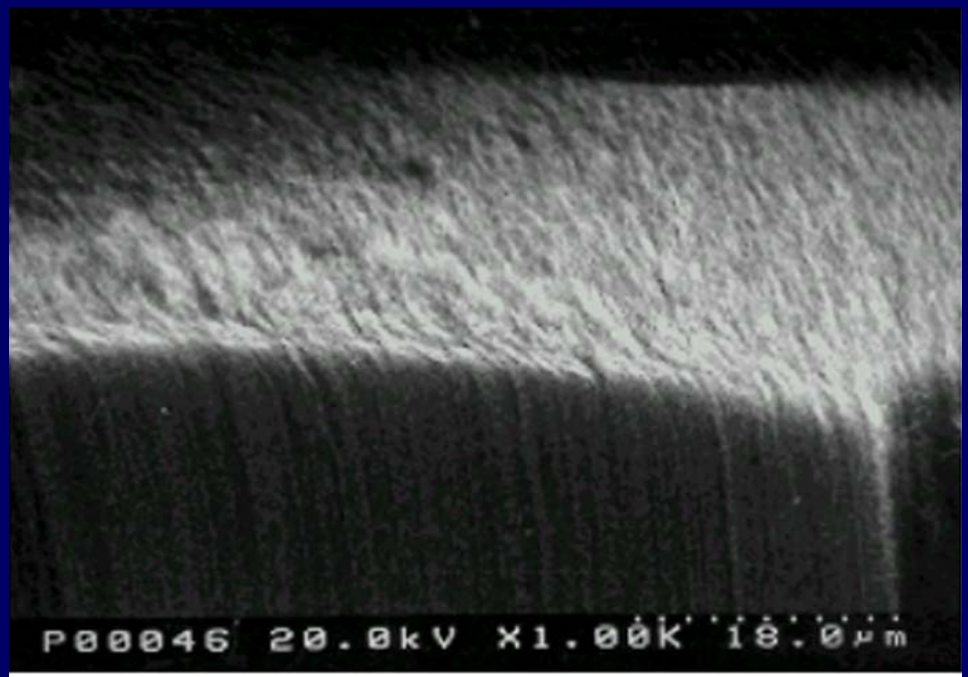
Each year:
~ 2 -3 in Nature or Science;
~ 20 in PRL and JACS.

Patents Application and Authorization

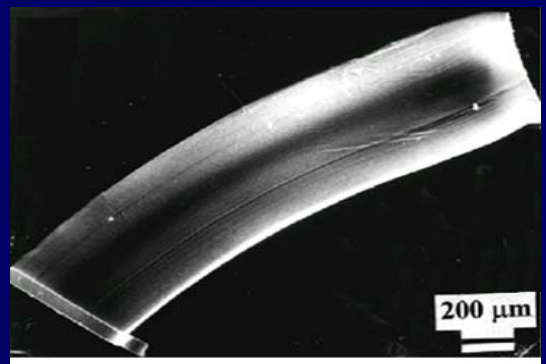


	1998	1999	2000	2001	2002	2003	2004
Application	16	22	30	42	116	55	66
Authorization	15	7	9	13	26	68	32

Synthesis of aligned nanotubes array



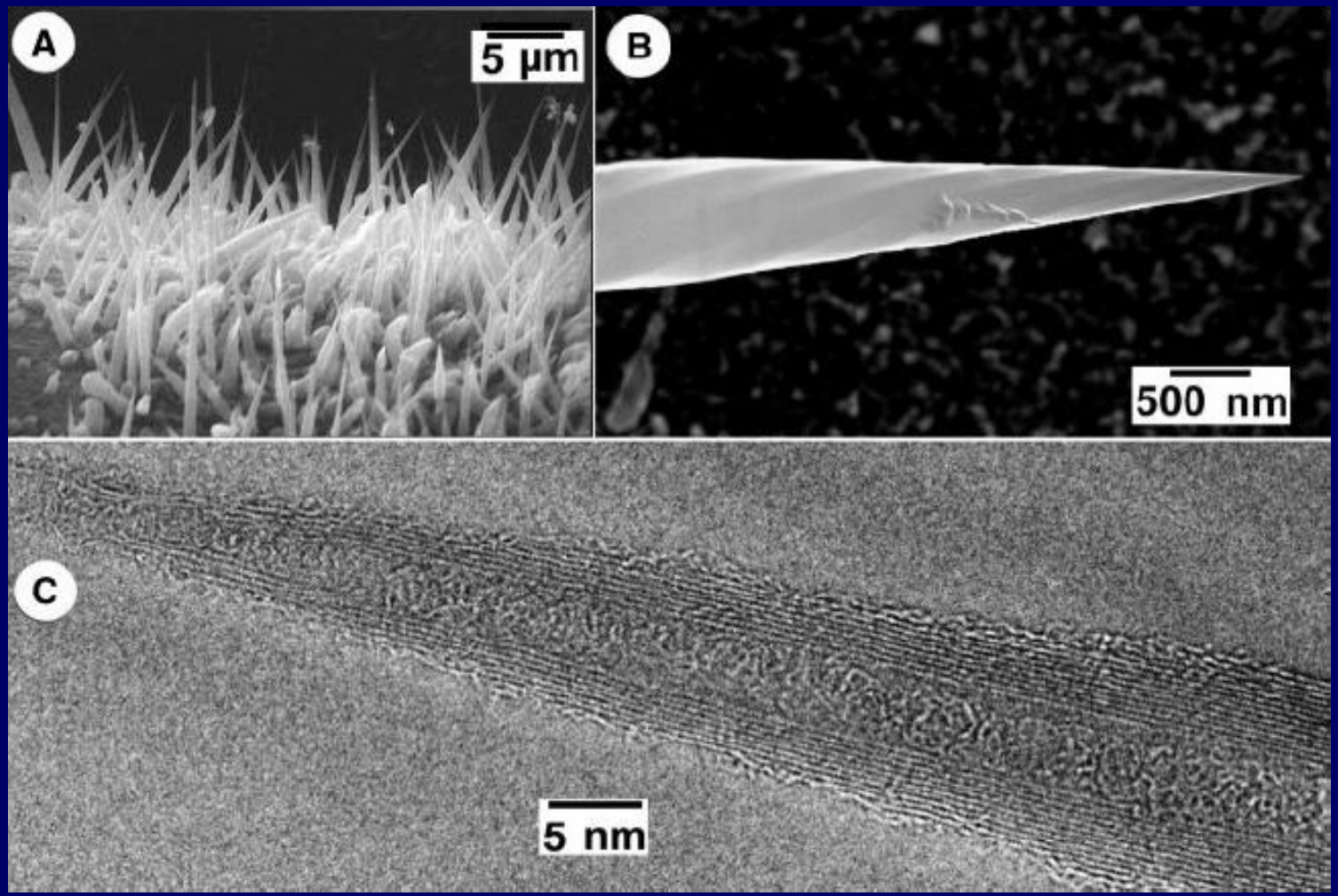
从衬底上取下的纳米碳管列阵底部的 SEM 像



超长的高密度、高纯度的多层纳米碳管列阵

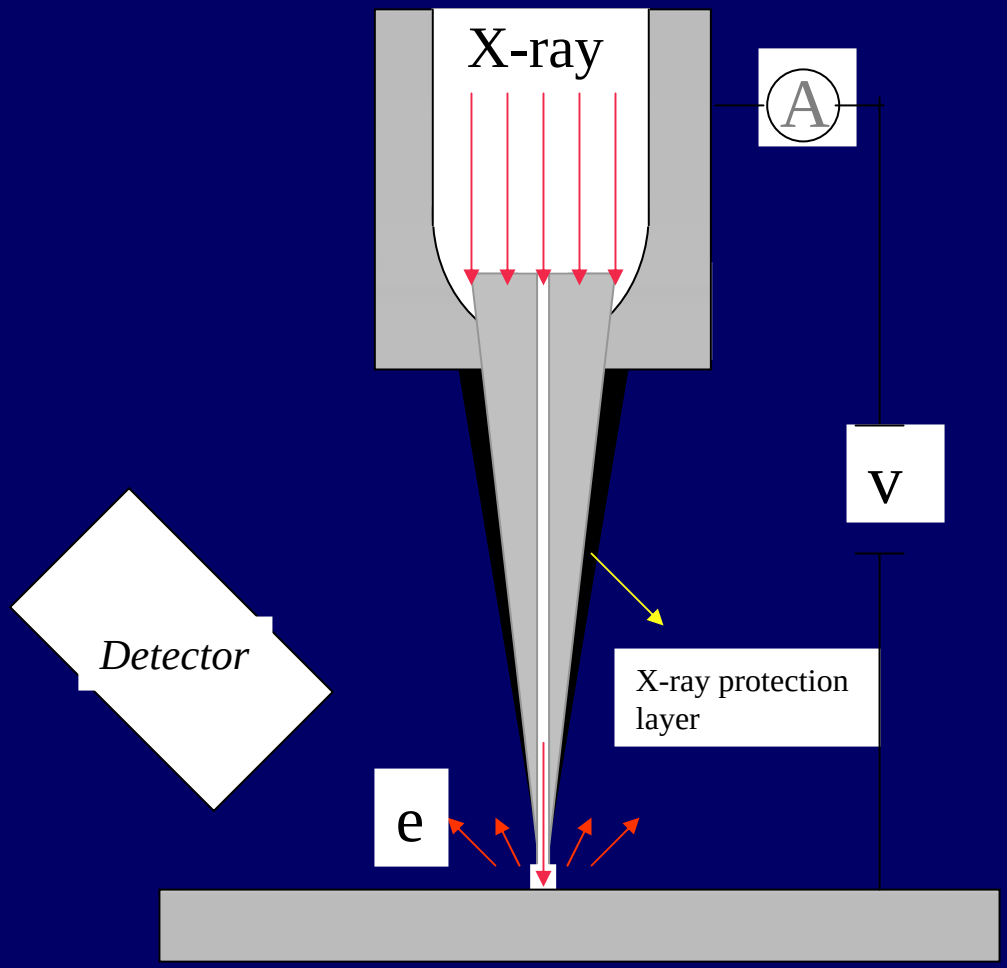
Nature 403, 403(2000); ***Nature*** 394, 631(1998);
Science 274, 1701(1996); ***Phys. Rev. Lett***. 84, 2701(2000);

Tubular Graphite Cones



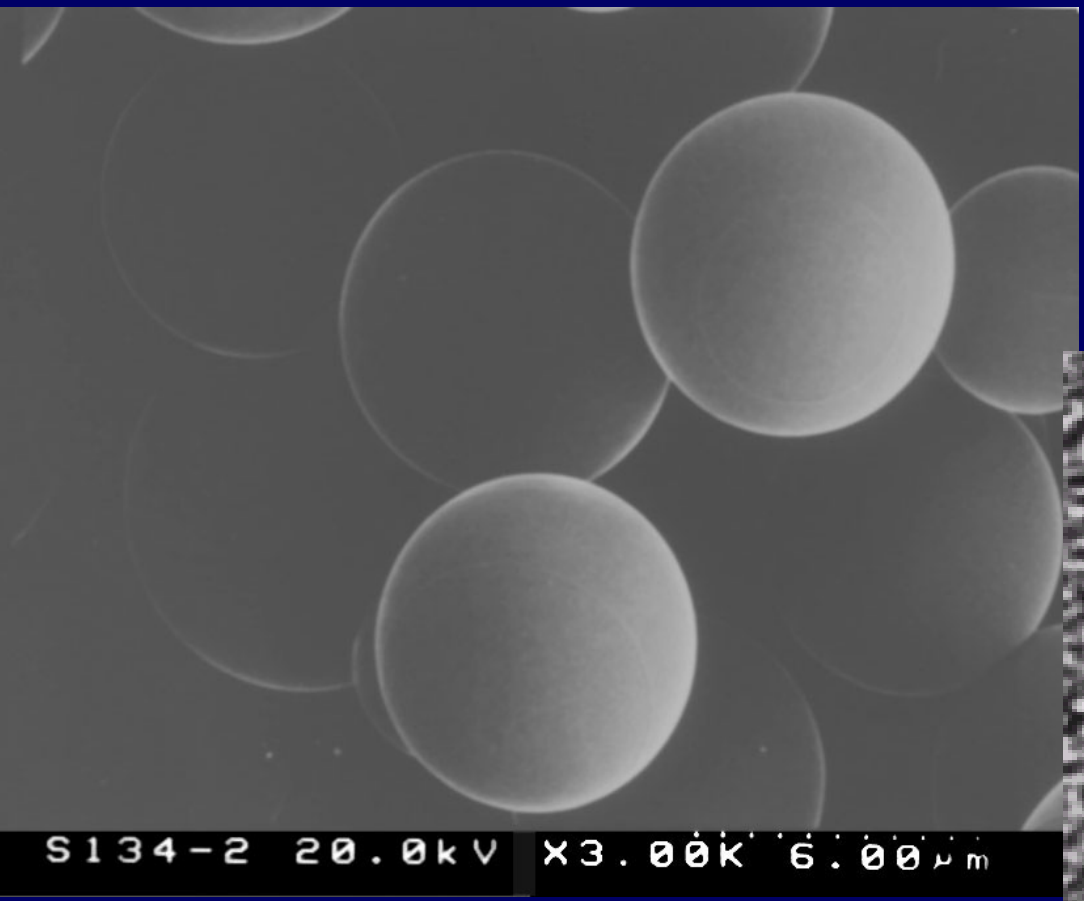
Science 300, 18 (2003)

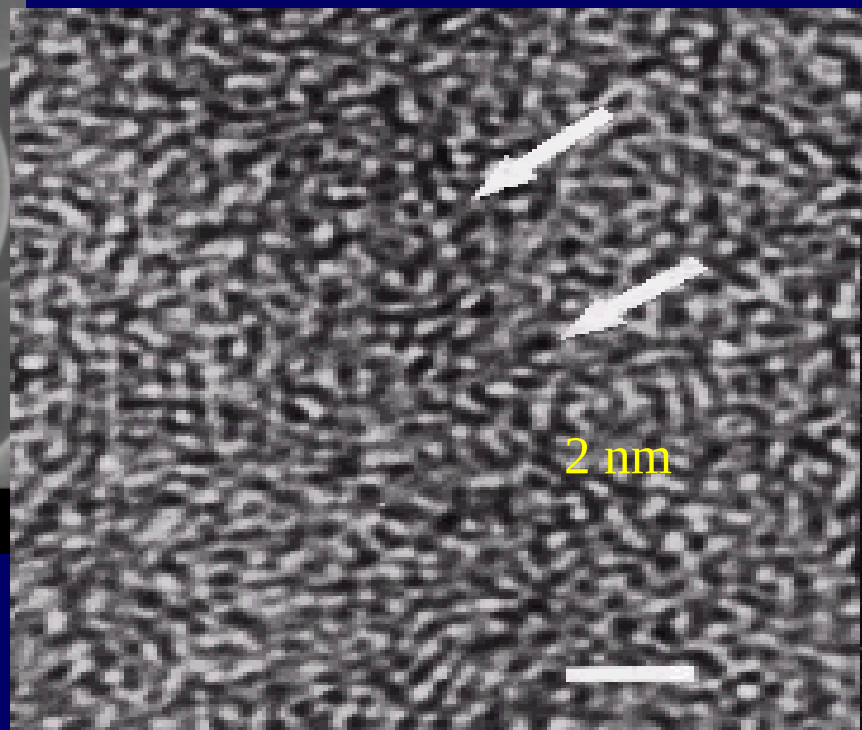
SPM with composition analysis

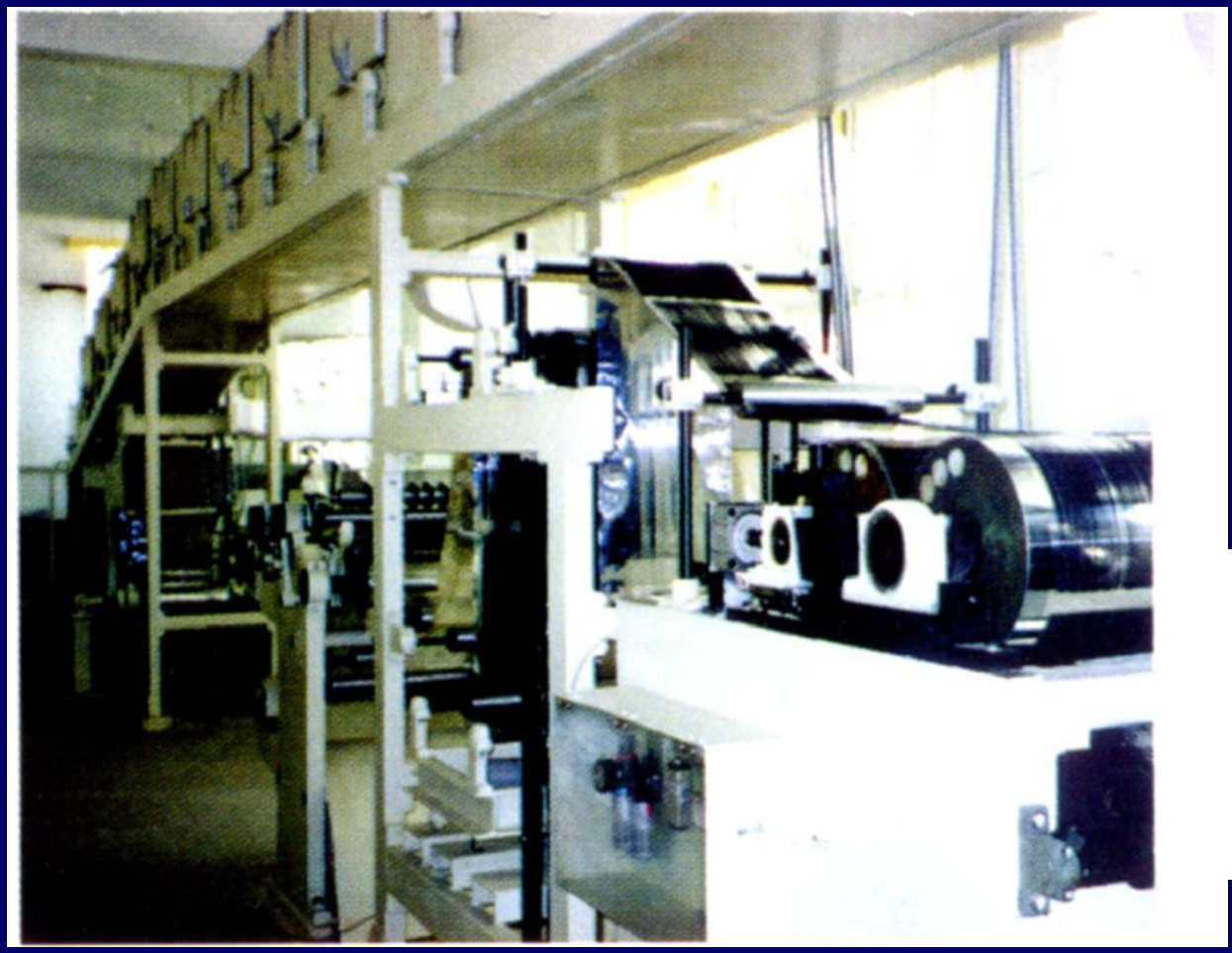


1) Hard as carbon nanotube, but more stable in radial direction.
2) Atomic resolution image and composition information of single/several atoms.

Hard Carbon Spherules (HCS)







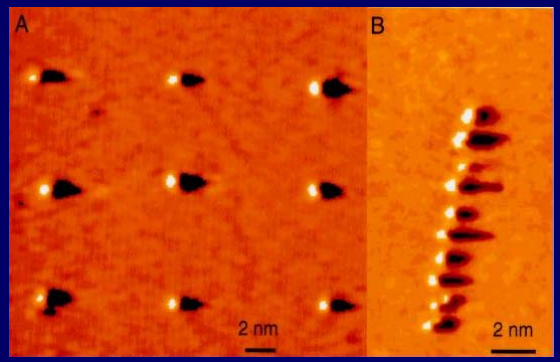
Beijing Phylion Battery Inc.

MICHELIN
CHALLENGE
BIBENDUM
必比登挑战赛

05年上海燃料电池+电池混合汽车示范运行车队和产业化项目华普油电混合汽车均采用我们的高功率锂离子电池

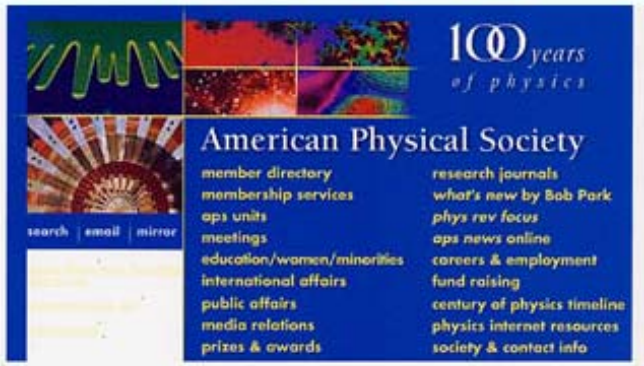
Ultrahigh density information storage

--- Towards the next generation of CD



Molecular recording on NBMN/pDA thin films, showing the size of the marks to be about 0.8 nm. The minimum distance between two recorded marks is 1.2 nm.

Phys. Rev. Lett. 84, 1780 (2000).



Physical Review Focus

Reversible, Nanometer-Scale Conductance Transitions in an Organic Complex
H. J. Gao, K. Sohlberg, Z. Q. Xue, H. Y. Chen, S. M. Hou, L. P. Ma, X. W. Fang, S. J. Pang, and S. J. Pennycook
Phys. Rev. Lett. 84, 1780 (21 February 2000)

Toward the Next Generation CD

16 February 2000

Andrew Gannon

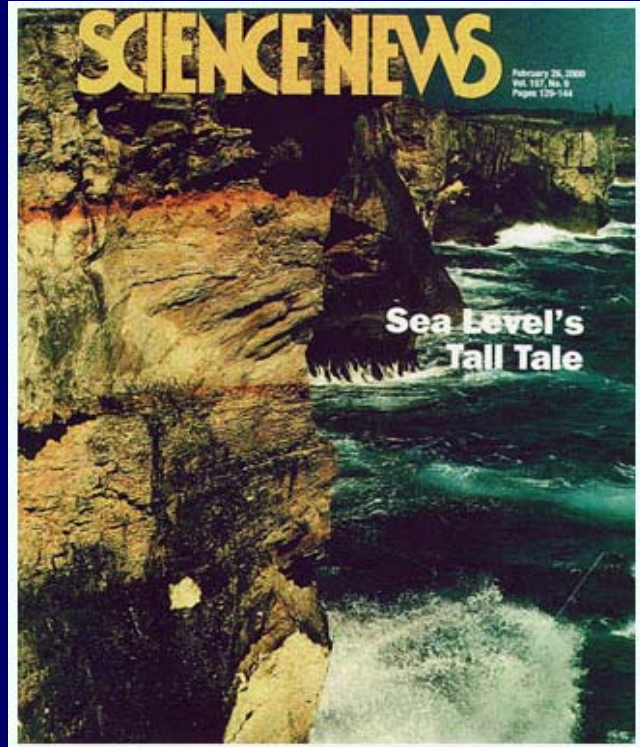
From punch cards to floppy disks to CD-ROM's, data storage devices continue to evolve. Researchers at the Oak Ridge National Laboratory (ORNL) in Tennessee don't know what the next device will look like, but they believe they know what it will be made of: thin films of complex organic compounds. They report in the 21 February *PRL* that they have produced reversible changes in electrical resistance in molecule-sized regions of organic thin films. The results help pave the way for making thin-film storage devices because they mark the first time anyone has demonstrated reversibility—needed for "writing" and then "erasing" data—at a molecular level.

Other researchers have shown they could induce changes in conductance—the equivalent of "writing"—to a thin film, says Karl Sohlberg, a theoretician with the Oak Ridge group. But using only heat or laser pulses, they haven't been able to "erase," or reverse, the transition without clearing entire regions of the film, as if shaking clear a whole Etch-a-Sketch.

Sohlberg says organic compounds have piqued the interest of data-storage makers because of their incredible storage capacity. A typical CD-ROM, for example, has a storage density of perhaps 10^8 bits per cm^2. The thin films used by the ORNL group and their colleagues at the Chinese Academy of Sciences in Beijing and the University of Chicago can store 10^{14} bits per cm^2—a million-fold increase. Sohlberg says that organic-based data storage will ultimately create headaches for the engineers who have to design the machines fast enough to read from and write to such materials, but "that's the engineering hurdle."

The team made films of a complex of two organic molecules on a graphite surface. By applying a range of voltages

Today's technology. Like punch cards and floppy disks, CD-ROM's may become obsolete if organic thin films live up to their potential for storing a million times more data.



Manhandled molecules, midget memories

Gangsters break someone's arm to deliver a message, leaving a powerful impression that may never go away. Now, a team of Chinese and U.S. scientists finds that roughing up organic molecules also can leave an enduring, though small, memory. In this case, however, some reverse strong-arming can quickly wipe out that memory.

Today's CD-ROMs squeeze 100 million bits into each square centimeter of recording surface. In the Feb. 21 PHYSICAL REVIEW LETTERS, Hongjun Gao of the Chinese Academy of Sciences in Beijing and his colleagues report writing and erasing data in minute dots. These dots could potentially be crammed together to encode information a million times more densely than CD-ROMs do and top even hard disks by a factor of nearly 100,000. However, the lab accomplishment remains far from commercial realization, the experimenters caution.

"This is very attractive work. It probably has applications as an organic [chemical]-based memory," comments James M. Tour of Rice University in Houston.

Gao, currently a guest scientist at Oak Ridge (Tenn.) National Laboratory, and the researchers have considered a class of carbon-based materials, called conjugated organic compounds, that show unusual electronic properties.

For many of the compounds, the molecules have positively and negatively charged ends. This polarization makes them push/veers for electric fields, which exert forces on the charged regions.

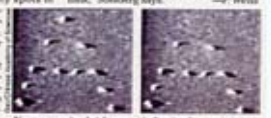
Testing two such compounds, 3-nitrobenzal malononitrile and 1,4-phenylenediamine, the researchers found that a blend of the plasticky substances can form a thin, electrically resistive coating on graphite or glass plates. By applying positive voltage pulses with the probe of a scanning tunneling microscope, the Chinese team created tiny spots in the film with only a ten-thousandth the electrical resistivity of the rest of the film. Each spot was a nanometer or less in diameter.

The researchers found that the spots hold their low resistivity until subjected to negative voltage pulses, which restore them to the high-resistivity state.

with scientists at the Oak Ridge lab and the University of Chicago. In a series of experiments, the collaborators discovered that the applied positive voltage transforms a patch of organic material into a disorderly, or amorphous, arrangement, which is much less resistive than the ordered crystalline film.

The voltage pulse wrestles the polarized molecules into their new configuration. "They get torqued, twisted, and all disoriented," says Karl W. Sohlberg of Oak Ridge. A pulse of opposite polarity realigns the molecules with the lattice.

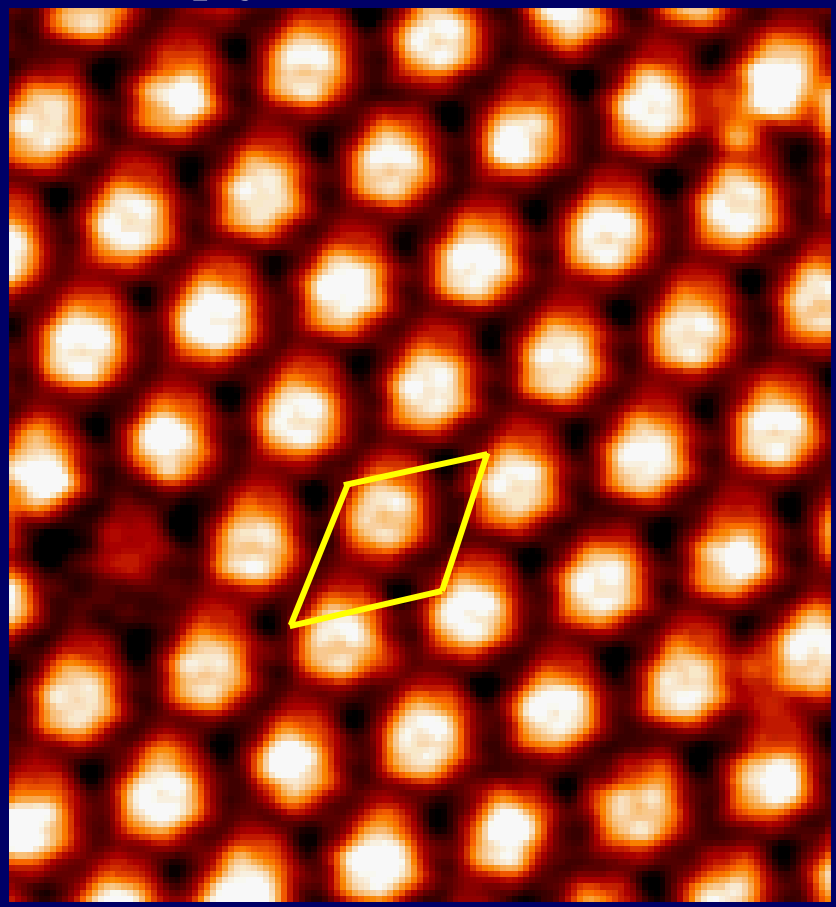
The number of molecules affected must be very small, the researchers argue, since each spot roughly covers one unit of the crystal structure. "If you're talking about reorienting individual molecules, we are certainly very close to that limit," Sohlberg says. —P. Weiss



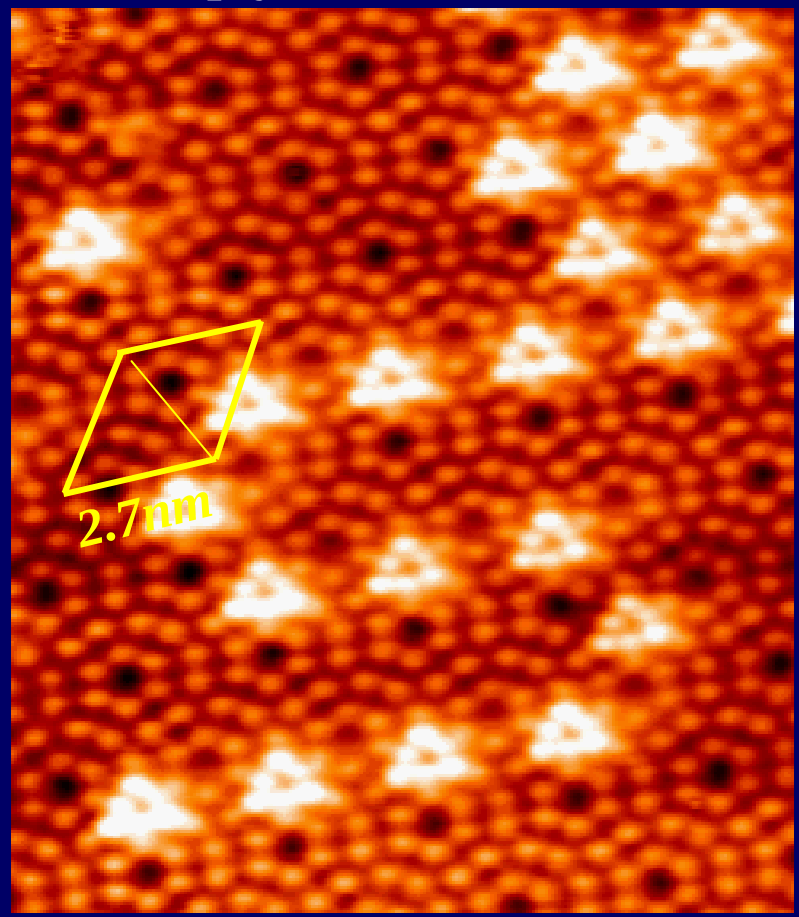
Nanometer-size bright spots, indicating low resistivity,

Growth of Identical In Nanodot Array on Si (111) Surface

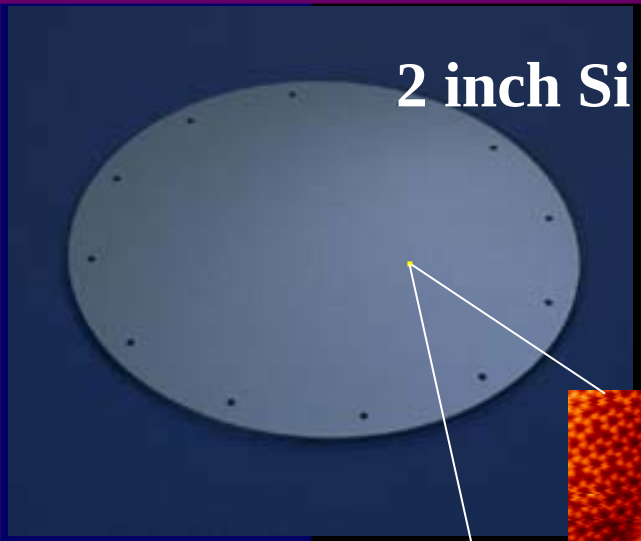
Empty States at +1.5V



Empty States at +0.6V



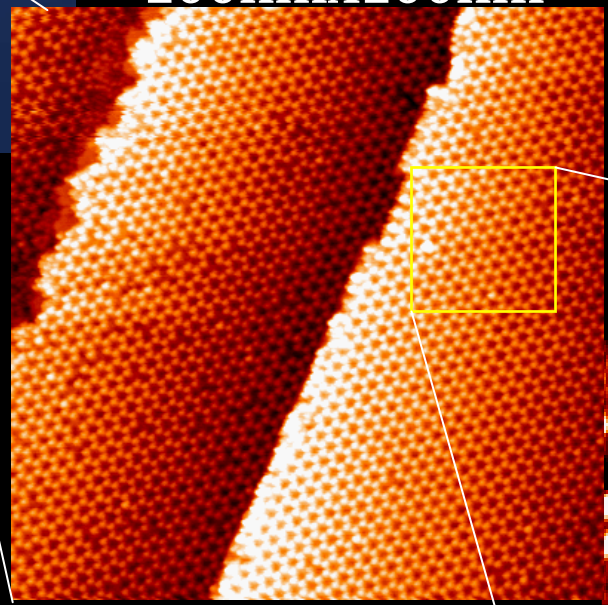
Phys. Rev. Lett. 88, 066101 (2002)



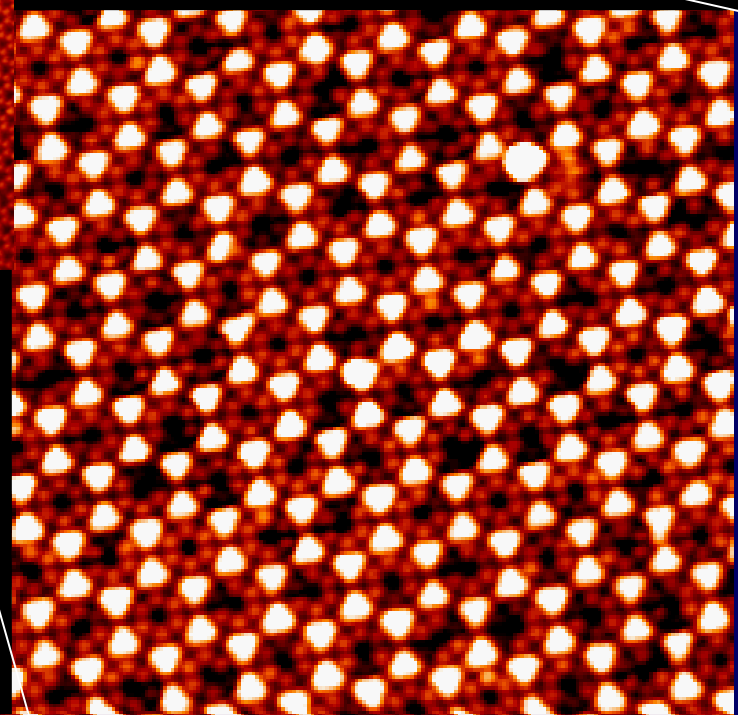
2 inch Si wafer

New Matter ：二维人造晶格

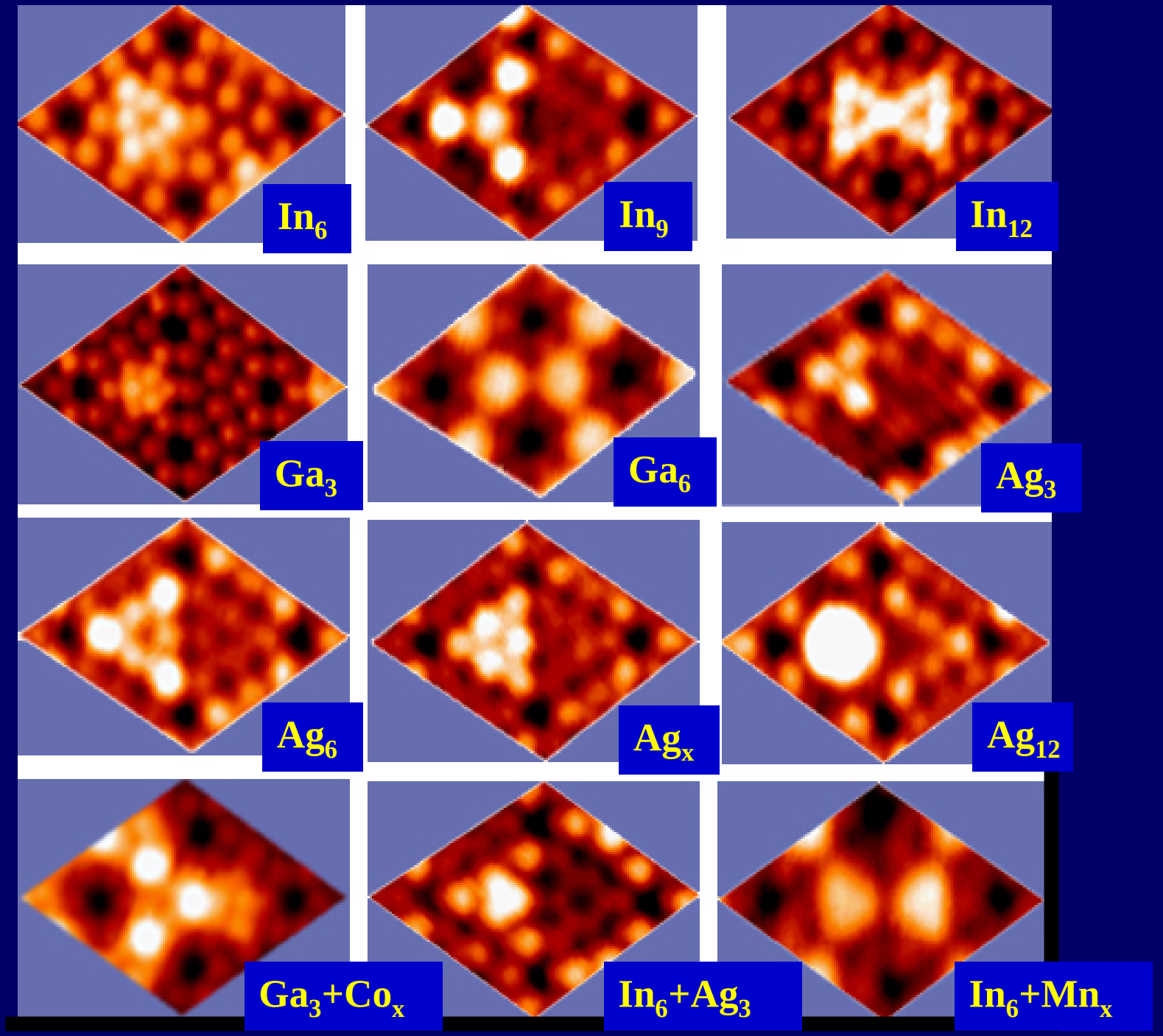
100nmx100nm



27nmx27nm

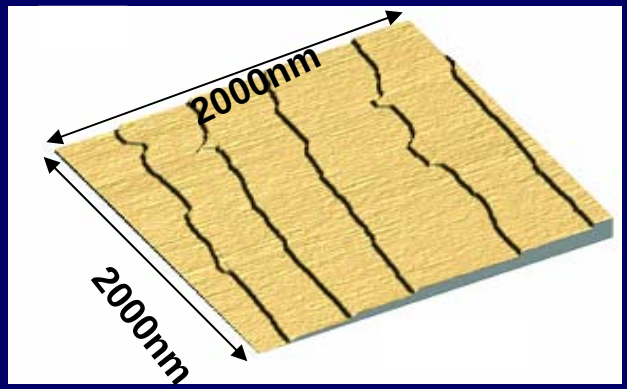


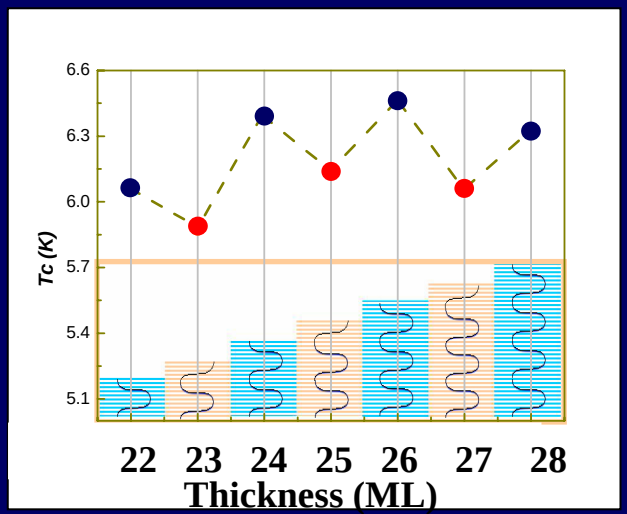
16种不同的点阵



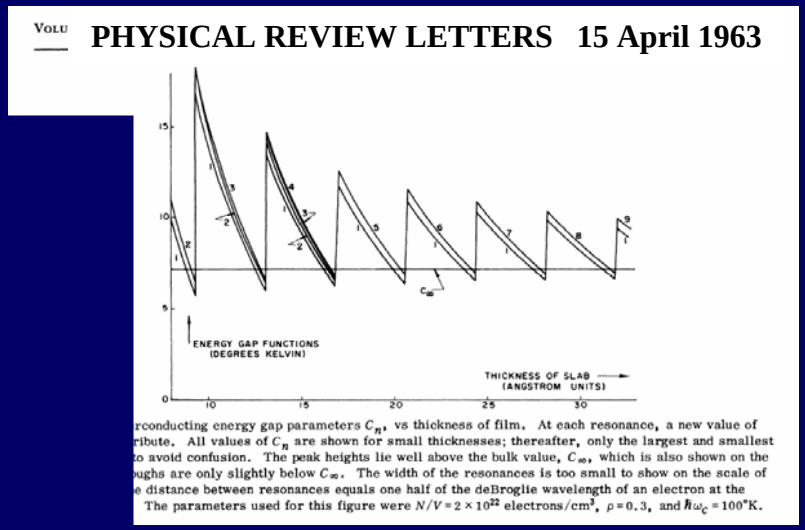
Oscillation of superconductivity *vs* film thckness

BCS theory states that Tc depends on the electron density at Fermi level. We indeed found the Tc oscillation between 6K and 6.5K with the expected period of 2 atomic layers.





Guo et al., SCIENCE 306, 1915 (2004)


VOLU PHYSICAL REVIEW LETTERS 15 April 1963

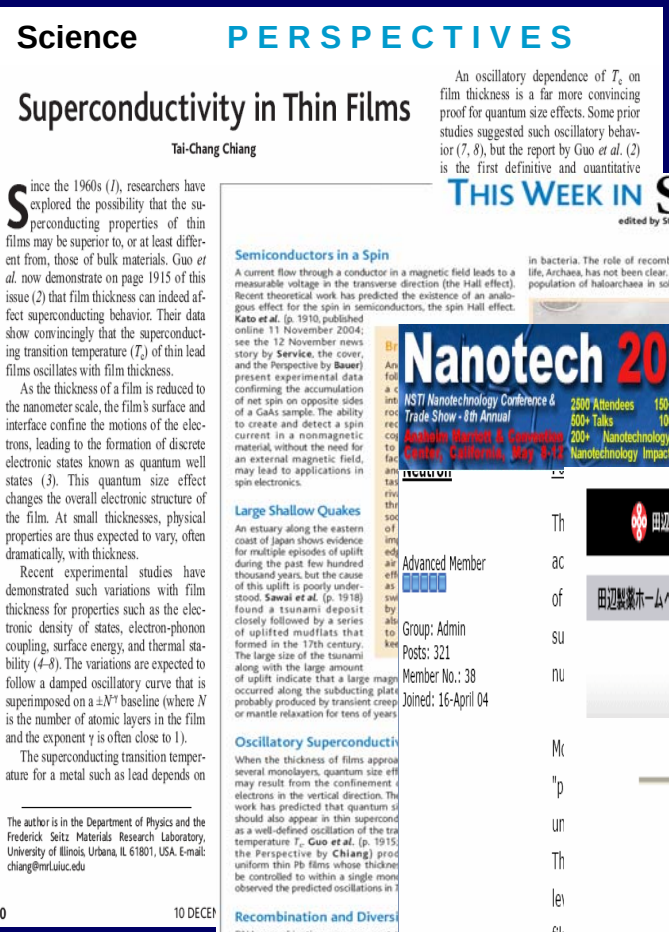
ENERGY GAP FUNCTIONS (DEGREES KELVIN)

THICKNESS OF SLAB (ANGSTROM UNITS)

rconducting energy gap parameters C_n, vs thickness of film. At each resonance, a new value of ribute. All values of C_n are shown for small thicknesses; thereafter, only the largest and smallest to avoid confusion. The peak heights lie well above the bulk value, C_∞, which is also shown on the oughs are only slightly below C_∞. The width of the resonances is too small to show on the scale of e distance between resonances equals one half of the deBroglie wavelength of an electron at the The parameters used for this figure were $N/V = 2 \times 10^{22}$ electrons/cm^3, $\rho = 0.3$, and $\hbar\omega_c = 100$°K.

J. M. Blatt and C. J. Thompson, *Phys. Rev. Lett.* 10, 332 (1963)

Science 2; Phys.Rev.Lett.17


Science PERSPECTIVES

Superconductivity in Thin Films

Tai-Chang Chiang

Since the 1960s (1), researchers have explored the possibility that the superconducting properties of thin films may be superior to, or at least different from, those of bulk materials. Guo *et al.* now demonstrate on page 1915 of this issue (2) that film thickness can indeed affect superconducting behavior. Their data show convincingly that the superconducting transition temperature (T_c) of thin lead films oscillates with film thickness.

As the thickness of a film is reduced to the nanometer scale, the film's surface and interface confine the motions of the electrons, leading to the formation of discrete electronic states known as quantum well states (3). This quantum size effect changes the overall electronic structure of the film. At small thicknesses, physical properties are thus expected to vary, often dramatically, with thickness.

Recent experimental studies have demonstrated such variations with film thickness for properties such as the electronic density of states, electron-phonon coupling, surface energy, and thermal stability (4–8). The variations are expected to follow a damped oscillatory curve that is superimposed on a $\pm N^{-\gamma}$ baseline (where N is the number of atomic layers in the film and the exponent γ is often close to 1).

The superconducting transition temperature for a metal such as lead depends on

An oscillatory dependence of T_c on film thickness is a far more convincing proof for quantum size effects. Some prior studies suggested such oscillatory behavior (7, 8), but the report by Guo *et al.* (2) is the first definitive and quantitative

The author is in the Department of Physics and the Frederick Seitz Materials Research Laboratory, University of Illinois, Urbana, IL 61801, USA. E-mail: chiang@mrl.uiuc.edu

10 DECEM

THIS WEEK IN Science

edited by Stella Hurtley and Phil Szuromi

Semiconductors in a Spin

A current flow through a conductor in a magnetic field leads to a measurable voltage in the transverse direction (the Hall effect). Recent theoretical work has predicted the existence of an analogous effect for the spin in semiconductors, the spin Hall effect. **Kato et al.** (p. 1910, published online 11 November 2004; see the 12 November news story by **Service**, the cover, and the Perspective by **Bauer**) present experimental data confirming the accumulation of net spin on opposite sides of a GaAs sample. The ability to create and detect a spin current in a nonmagnetic material, without the need for an external magnetic field, may lead to applications in spin electronics.

Large Shallow Quakes

An estuary along the eastern coast of Japan shows evidence for multiple episodes of uplift during the past few hundred thousand years, but the cause of this uplift is poorly understood. **Sawai et al.** (p. 1918) found a tsunami deposit closely followed by a series of uplifted mudflats that formed in the 17th century. The large size of the tsunami along with the large amount of uplift indicate that a large magn occurred along the subducting plate probably produced by transient creep or mantle relaxation for tens of years

Oscillatory Superconducti

When the thickness of films approa several monolayers, quantum size eff may result from the confinement electrons in the vertical direction. Th work has predicted that quantum s should also appear in thin superco as a well-defined oscillation of the tra temperature T_c. **Guo et al.** (p. 1915; the Perspective by **Chiang**) proc uniform thin Pb films whose thickne be controlled to within a single mono observed the predicted oscillations in

Recombination and Diversi

DNA recombination may represent t eukaryotes and a major source of ad

in bacteria. The role of recombination in the third branch of life, Archaea, has not been clear. **Papke et al.** (p. 1928) analyze a population of haloarchaea in solar salterns near Alicante, Spain. The association of gene alleles is essentially arbi-

Nanotech 2005

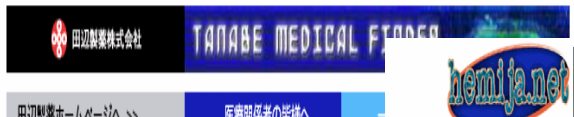
NSTI Nanotechnology Conference & Trade Show - 8th Annual

2500 Attendees 150+ Exhibitors
500+ Talks 100+ Startups
200+ Nanotechnology Ventures
Nanotechnology Impact Workshop

Health Care Materials Transporation Energy
Nanobiotech NSTI Surfaces Personal Care Food
Environment Telecom Displays Optics Polymers
Electronics Simulation Design Coatings

Advanced Member

Group: Admin
Posts: 321
Member No.: 38
Joined: 16-April 04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医療関係者の皆様へ

http://physicsweb.org/
2004/12/09

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Forum.Hemij

Кон врвот | П

Нова тема

Ваше име:

Ваша email адр

Тема:

Новости на He
Супепрпровод
со нивната деф
Kun Xue и copa
откриле дека н
бројот на атом

КОМЕНТАР:

Испрати


visit today More Flexibility

nature physicsporta

researchhighlight

In brief: just like that

Spontaneous Assembly of Perfectly Ordered Identical-Size Nanocluster Arrays

feed

Google Search

Carbon Nanotubes Yield A New Class Of Biological Sensors

Purdue Engineers Create Model For Testing Transistor Reliability

Lower-cost approach

By using hydrogen-bonding reactions, the group demonstrated that ele films can be fabricated on silicon, glass, ceramic and organic-polymer s method is said to offer a lower-cost approach that nevertheless improv

Supercon to nano-s

The critical temperatu controlled by changin

From Margriet J Van Bael and Kristi in the Laboratory for Solid State Ph and Magnetism, Katholieke Unive Leuven, Belgium

Imagine measuring the electrica of a perfect rectangular copper reduced its thickness, layer by at What would happen? Initially, th would increase smoothly as the c of the bar became smaller, ab electrons in the bar would rem move in any direction. But at s when the thickness reached the range, the motion of the electr vertical direction would be restri

This confinement can give ri ordinary physical properties. N Xue of the Chinese Academy of Beijing and co-workers have fou superconducting transition tem the temperature below which th drops to zero – of thin films ma varies with the number of atom the film (Y Guo *et al.* 2004 *Scienc*

Super states

The motion of electrons in a thin ponds to the textbook example particles in a box, and is best und treating the electrons as waves particles. When confined with ultrathin layer, the electrons can certain "quantum well" states that corres pond to standing waves across the thickness of the film, similar to the standing waves along the length of an organ pipe.

In fact, only a small fraction of the huge number of electrons in a material is involved in physical processes such as conductivity:

24

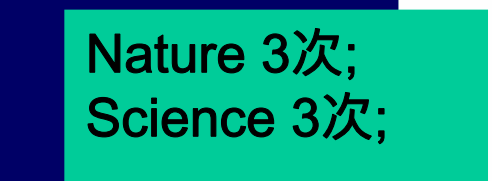
physicsweb.org

PHYSICS WORLD FEBRUARY 2005

CMP

Google Search

Expedia.com

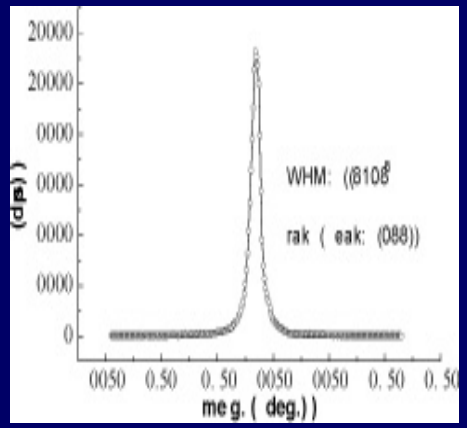

Nature 3次;
Science 3次;
…


Institute of Physics CAS

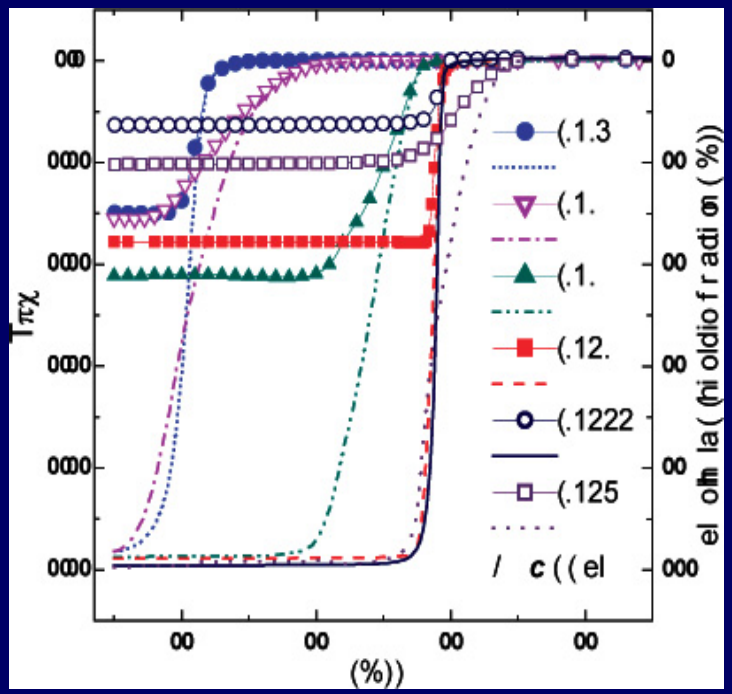

Institute of Physics

$La_{2-x}Sr_xCuO_4$ crystal

Universal nodal Fermi velocity; X.J. Zhou, F. Zhou, J.W. Xiong, Z.X. Zhao et al., *Nature*, 423 (2003)398



High quality large scale LaSrCuO crystals are grown by TSFZ method;



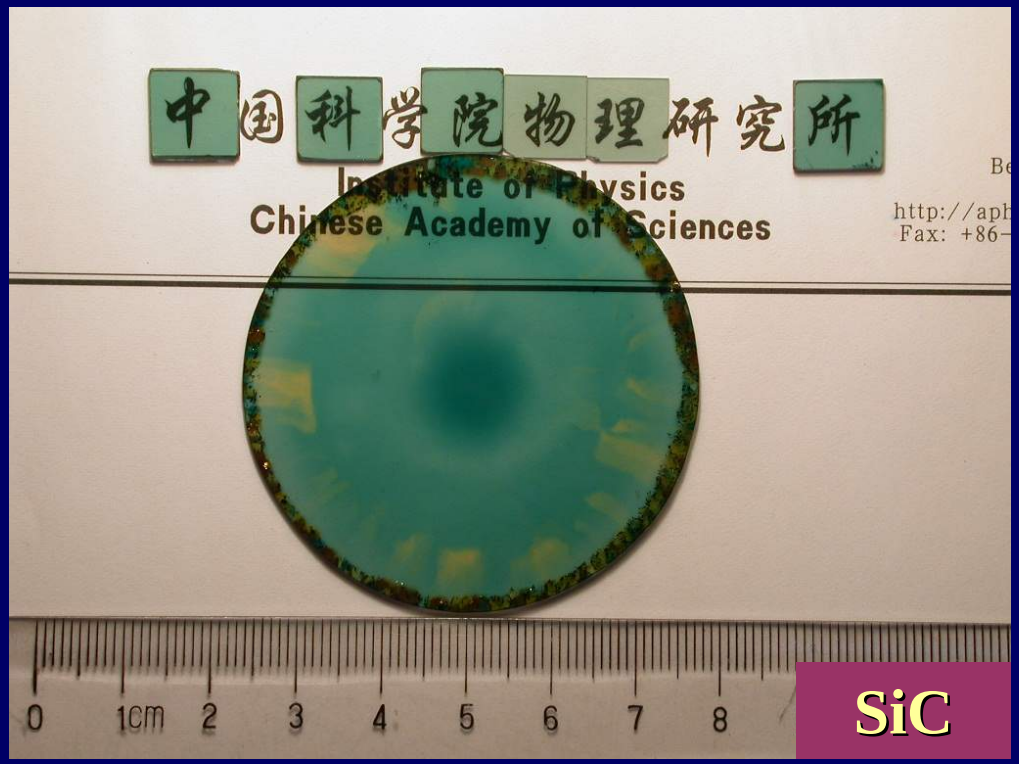
Tc changes at hole concentration: x = 1/16 and x = 1/9, magic numbers;

SiC Crystsal

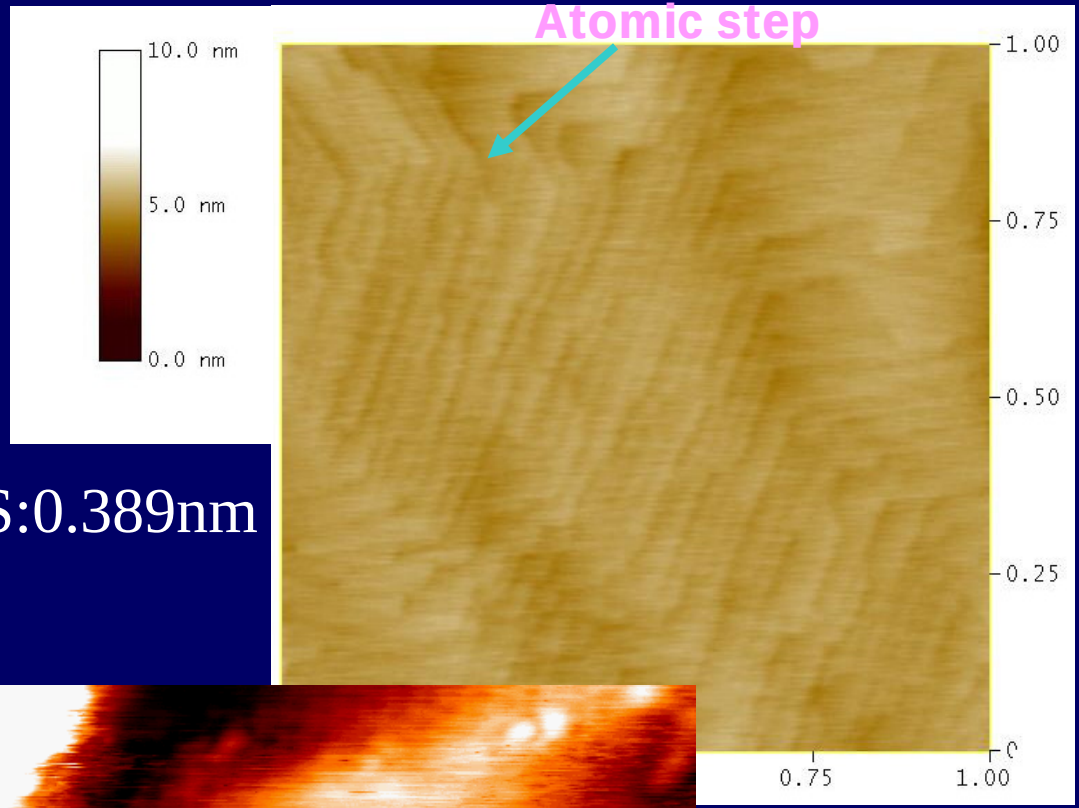
High quality SiC crystal with 2 inch in diameter;

Defects < 100/cm^2 for 10x10 mm^2;

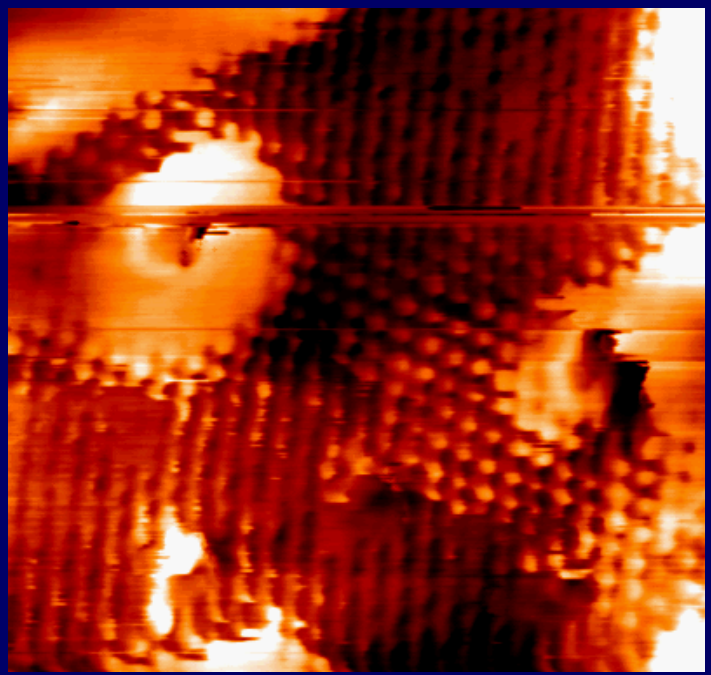
(Better than that of Cree)

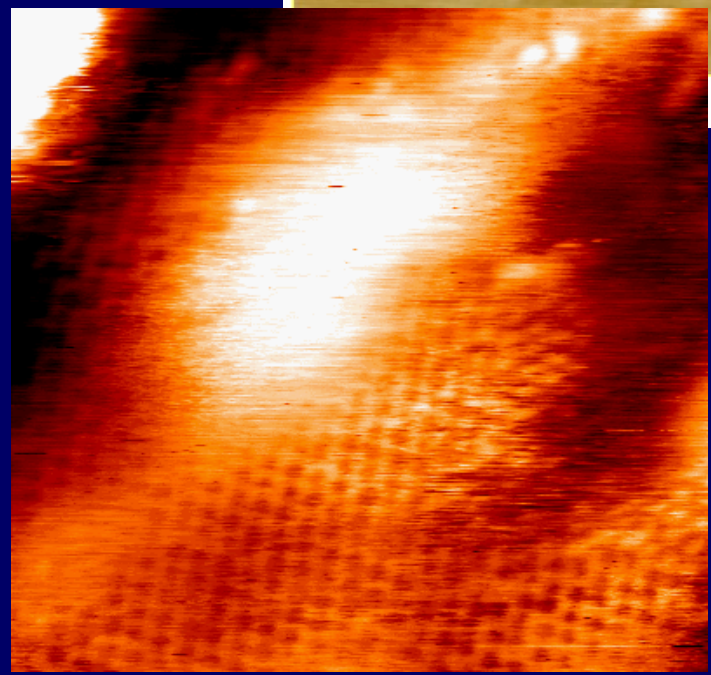


ZnO surface with atomic flat



RMS:0.389nm





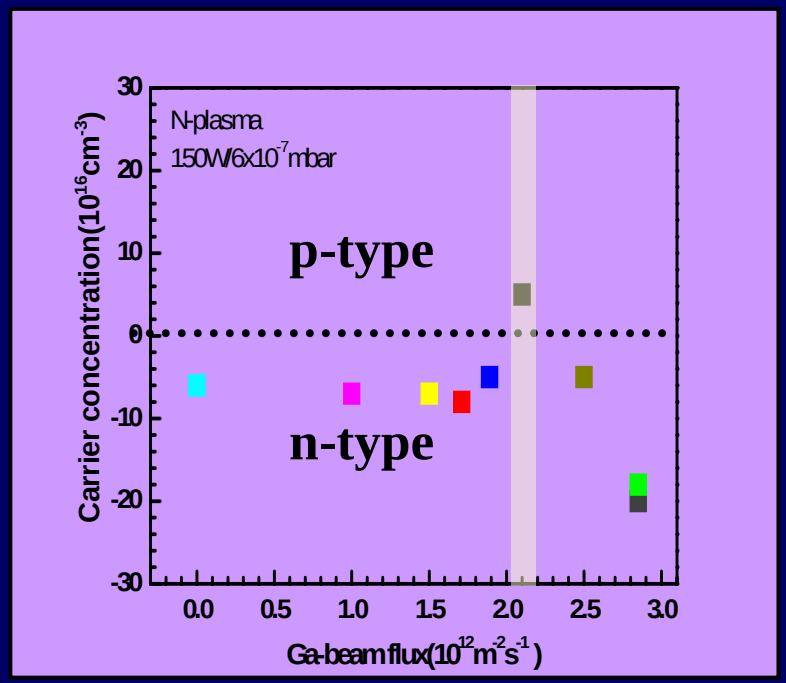
p-type ZnO crystal film

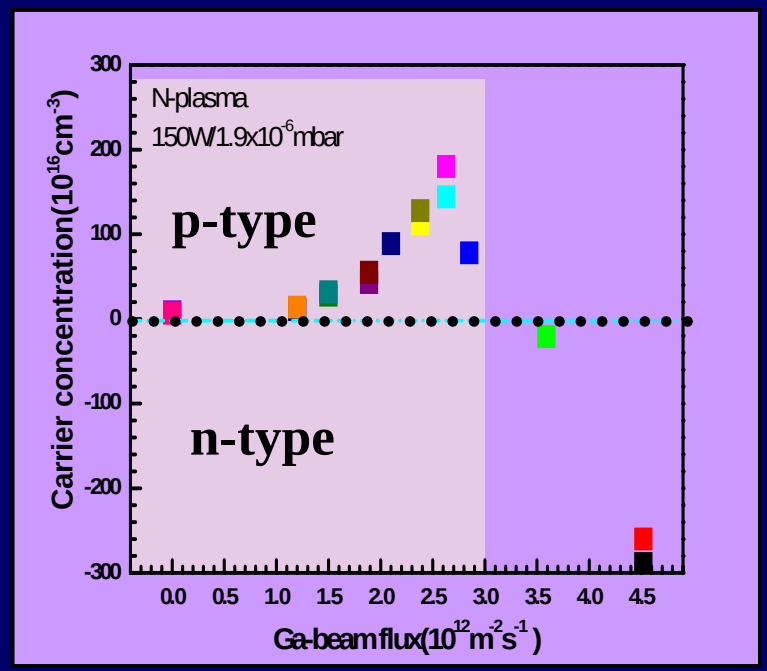
❖ Ga+N co-doping

- ➢ Narrow codoping window
- ➢ Low hole concentration: $5x10^{16}cm^{-3}$

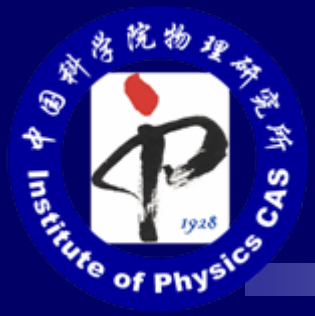
❖ Li+Ga+N triple-doping

- ➢ Much broader window
- ➢ High hole concentration : $3.6x10^{18}cm^{-3}$





ZnO基p-n同质结发光二极管的研制获得较大进展！



Evaluation

Institute review process

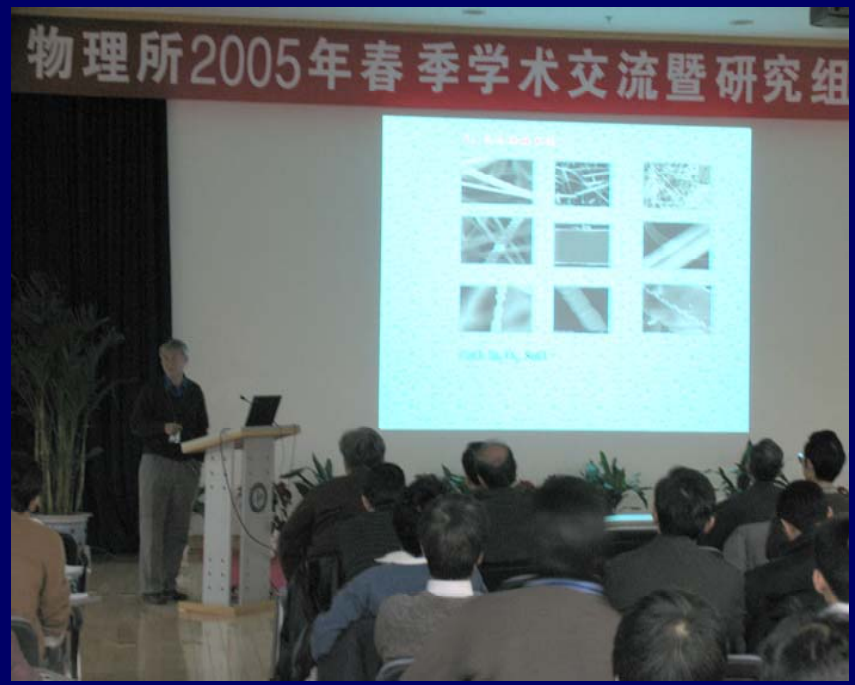
- Performance measures include science and technology excellence, mission impact, facility operations; (impact on science; success in long-term, …)
- Annual performance reviews for all research groups (impacts salary and promotions);
- All projects and facilities undergo competitive peer review (every 3 years): 2-step review process;
- The institute is reviewed annually by CAS: Science and technology, operations, community service and outreach.

2005. 1

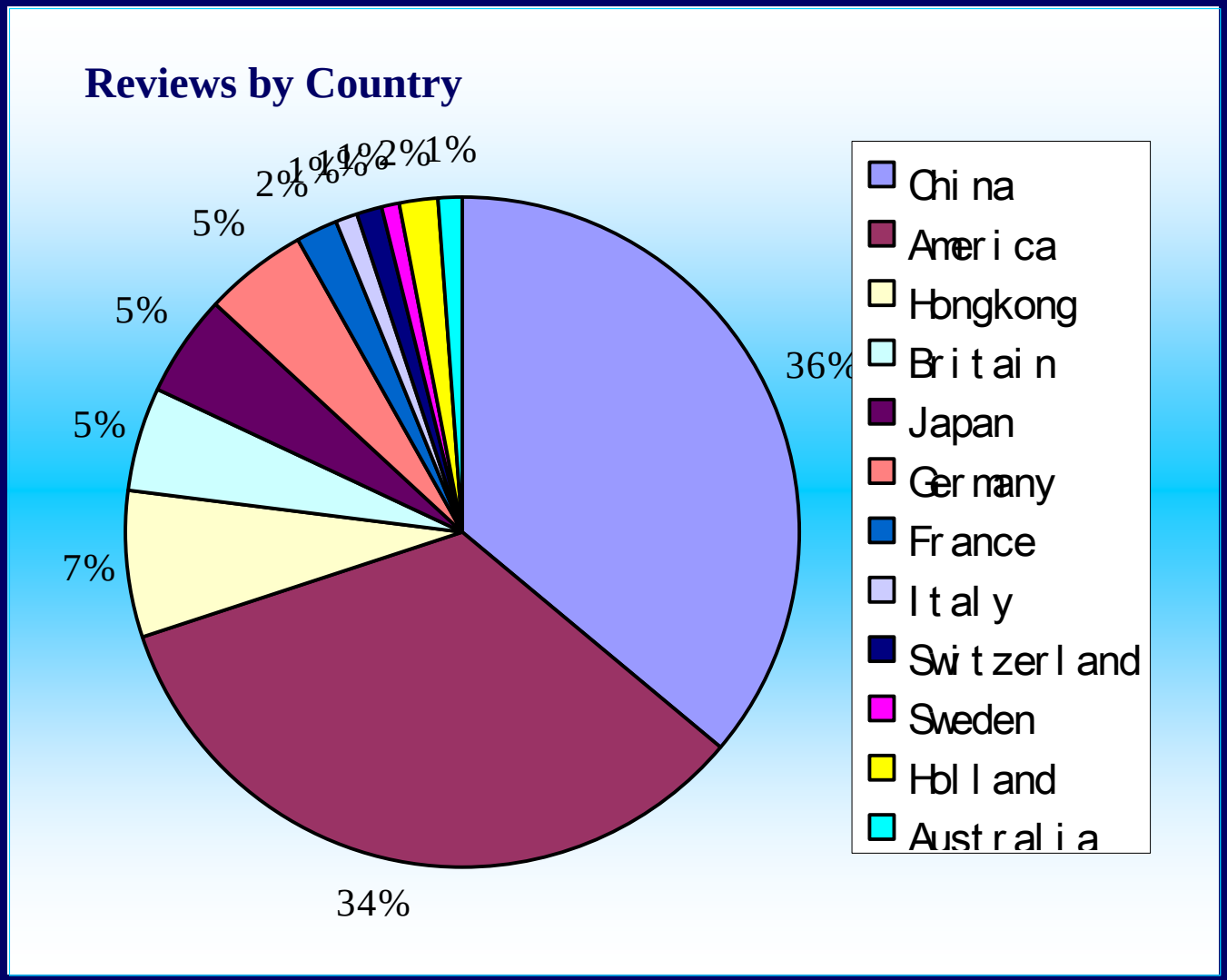
Research groups: 45 in the period of 2005.1 - 2007.12;

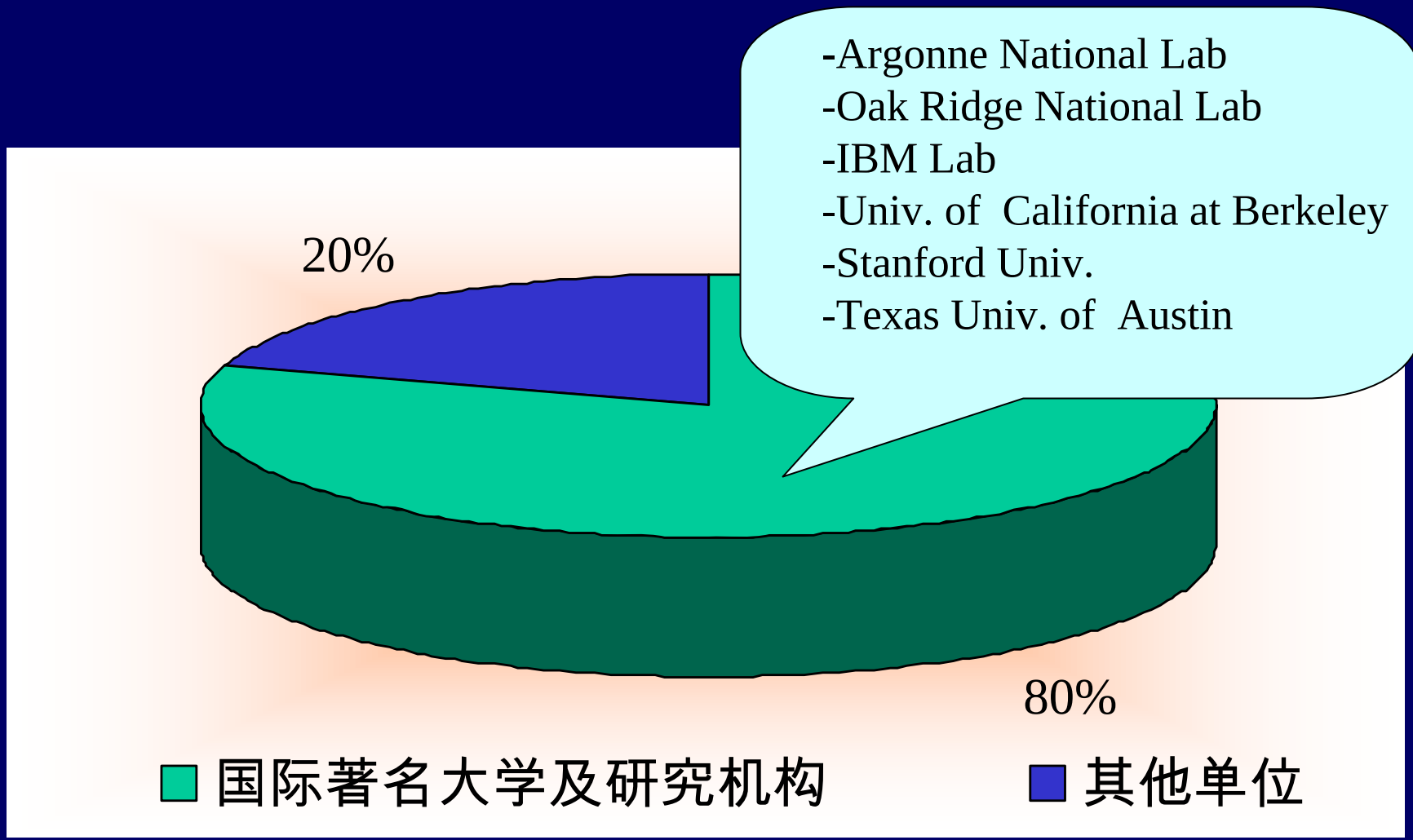
(new groups: 7, new group leaders (PI): 14)

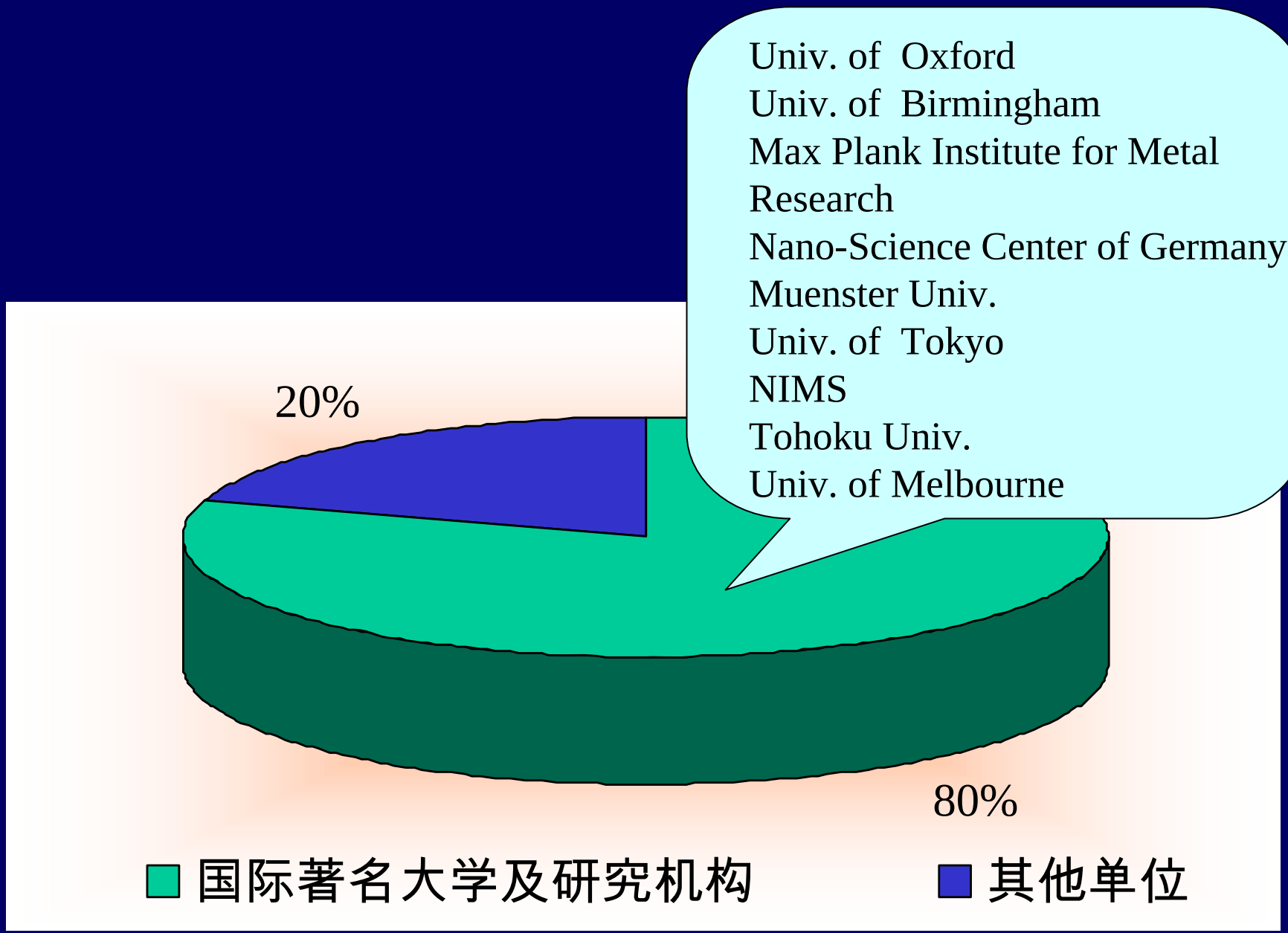
Total changes > 1/3 for every 3 years.

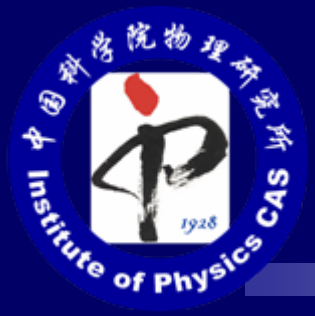


Reviews by Country




-Argonne National Lab
-Oak Ridge National Lab
-IBM Lab
-Univ. of California at Berkeley
-Stanford Univ.
-Texas Univ. of Austin
20%
80%
国际著名大学及研究机构
其他单位


Univ. of Oxford
Univ. of Birmingham
Max Plank Institute for Metal Research
Nano-Science Center of Germany, Muenster Univ.
Univ. of Tokyo
NIMS
Tohoku Univ.
Univ. of Melbourne
20%
80%
国际著名大学及研究机构
其他单位

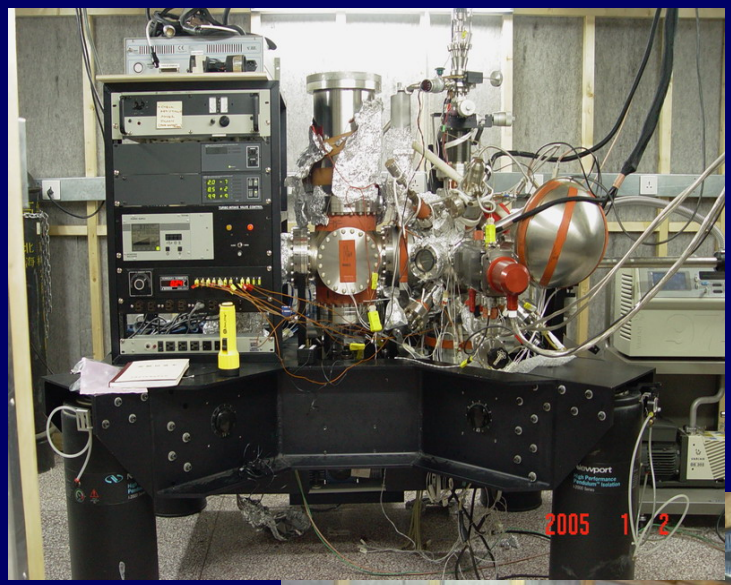


Attracting New Staff

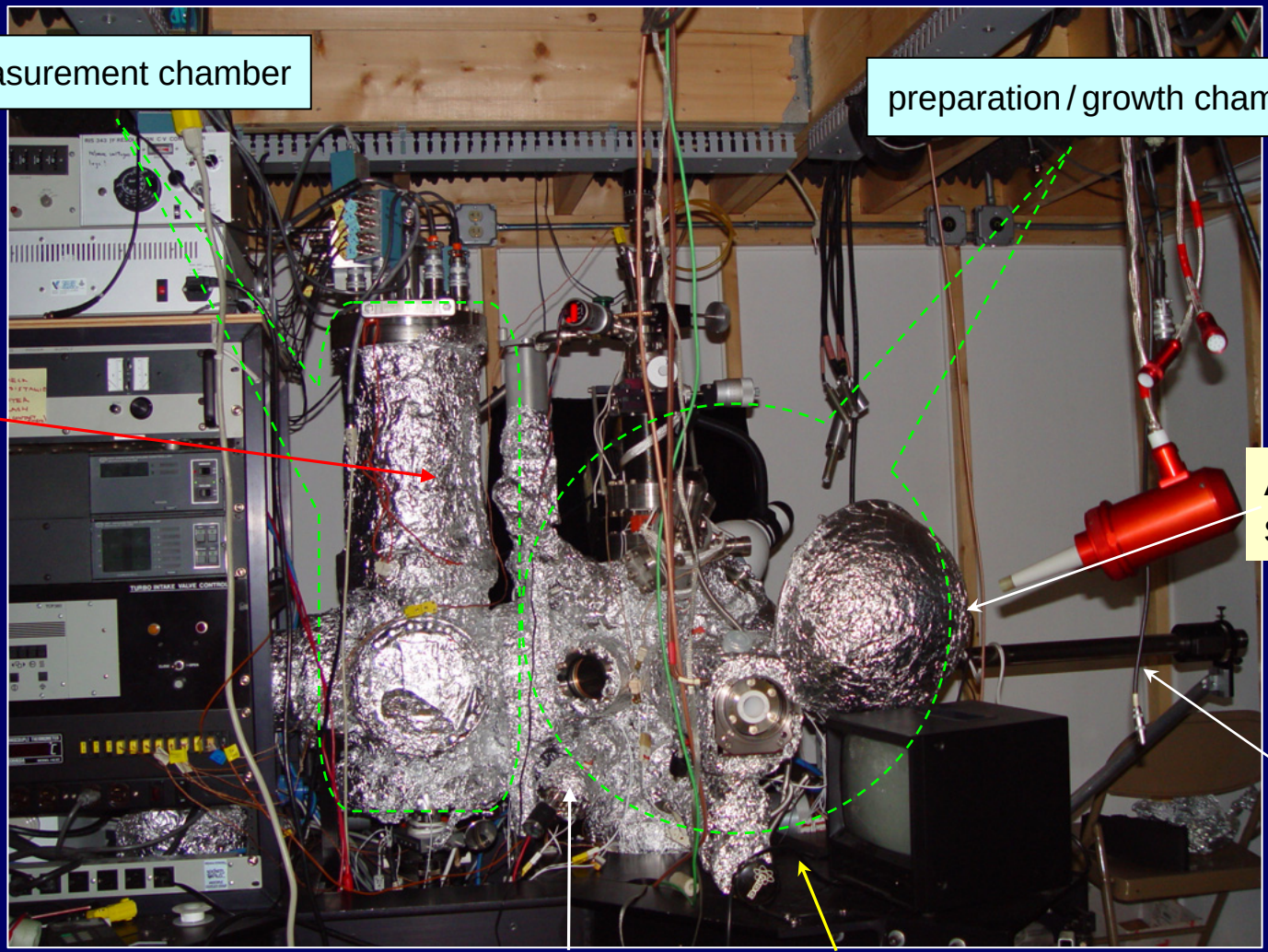
Policies to encourage and attract new staff

- CAS 100 talent program (highly competitive 3-year grants for new staffs at Asso. Prof. level);
- IOP talent program (highly competitive 2-year grants for new staffs at Assi. Prof. level);
- Distinguished scientist program (Full Prof. position);
- Strategic hire program (support for promising new staff in critical areas at all levels);
- “Star of the Year” Award for young and new staffs.

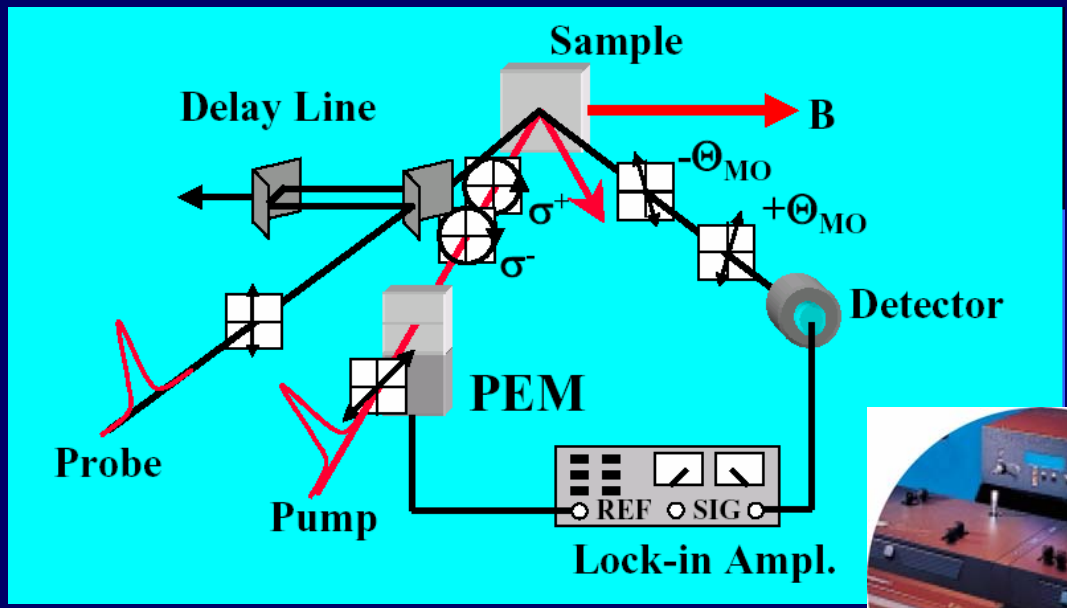
Lab for Solid State Quantum Information and Quantum Computation



Prof. D.M. Chen (2004.2 -)
Harvard Univ. (1990.12-2004.1)


measurement chamber
preparation / growth chamber
STM
cryostat
(5 - 300 K)
Auger
spectrometer
Sample
load lock
Evaporator
Total of 6
RHEED

Spin Dynamics Measurement System
(超快自旋动力学测量系统)



锁模掺钛蓝宝石脉冲激光器

双腔结构：120fs & 2ps（10ps）

波长范围：700-980nm；扩展波长：350-480nm

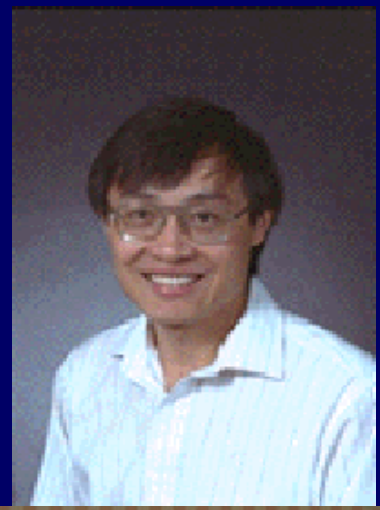
磁光超导磁系统

温度范围：4.2K～300K； 水平磁场：8T

Outstanding young researchers: 44

Prof. DM Chen (Harvard U)
Prof. XC Xie (OK State U)
Prof. SW Gao (Chalmers U)
Prof. HX Xu (Lund U)
Prof. XJ Zhou (LBNL)
Prof. JR Shi (UT Austin)
Prof. JD Guo (ORNL)
Prof. H Fan (UCLA)

… …



March 2005, LA

Star of the Year 2004

Young Researcher
Golden Symposium


祝贺方忠博士荣获物理所首届"科技新人奖"

方 忠 博士

中国科学院"百人计划"入选者（2003）
国家杰出青年科学基金获得者(2004)

学术经历

1987.09－1996.06　华中理工大学　学士、硕士、博士
1996.04－1996.06　香港中文大学 访问学者
1996.10－ 2003.04 日本产业技术总合研究所(AIST)　研究员
（其间2001.01－2001.08　美国橡树岭国家实验室　访问学者）
2003.04－　中国科学院物理研究所　研究员、博士生导师
量子模拟科学中心　主任

科研方向

1. 新型功能材料的电、磁、光学特性的第一原理计算研究;
2. 强关联体系中的奇异物性研究;
3. 有机材料、纳米体系、超晶格、表面及界面等的大规模量子模拟。

主要成果

多项研究成果发表于国际一流刊物（包括Phys. Rev. Lett. 7篇，Science 2篇），并被他人引用400余次。并次应邀在国际大型学术会议上作邀请报告，如MRS年会、JPS年会、欧洲计算物理会议等。

2000年发表在Science的文章，被德国著名的OMICRON网站评为2001年1月的"The Result of the Month"。2003年发表在Science的文章，通过对反常Hall效应的研究，首次证明动量空间中磁单极的存在，受到国内外同行的广泛关注。2000年获得日本原子技术联合研究中心（JRCAT）科研成果特等奖。

Graduate Students

Current Students: 586

M.S. degree: 214

Ph D degree: 372

Postdoc researchers: 22

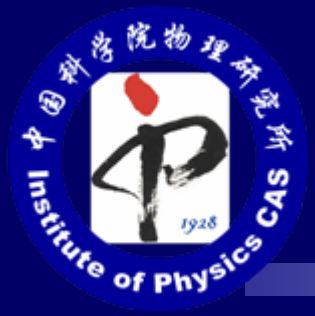
(Most of the students from the top univs. in China)

Graduate Student Awards

Dr. J.R. Luo, ICDD Ludo Frevel (2005)

Dr. W.G. Zhu, MRS Graduate Student Silver Award (2004)

	Place	No.			Place	No.
CAS President Award	Excellent	2		宝钢奖	CAS	2
	First	5		宝洁奖	CAS	4
刘永龄奖	CAS	3		Excellent Thesis	CAS Nation	2 1

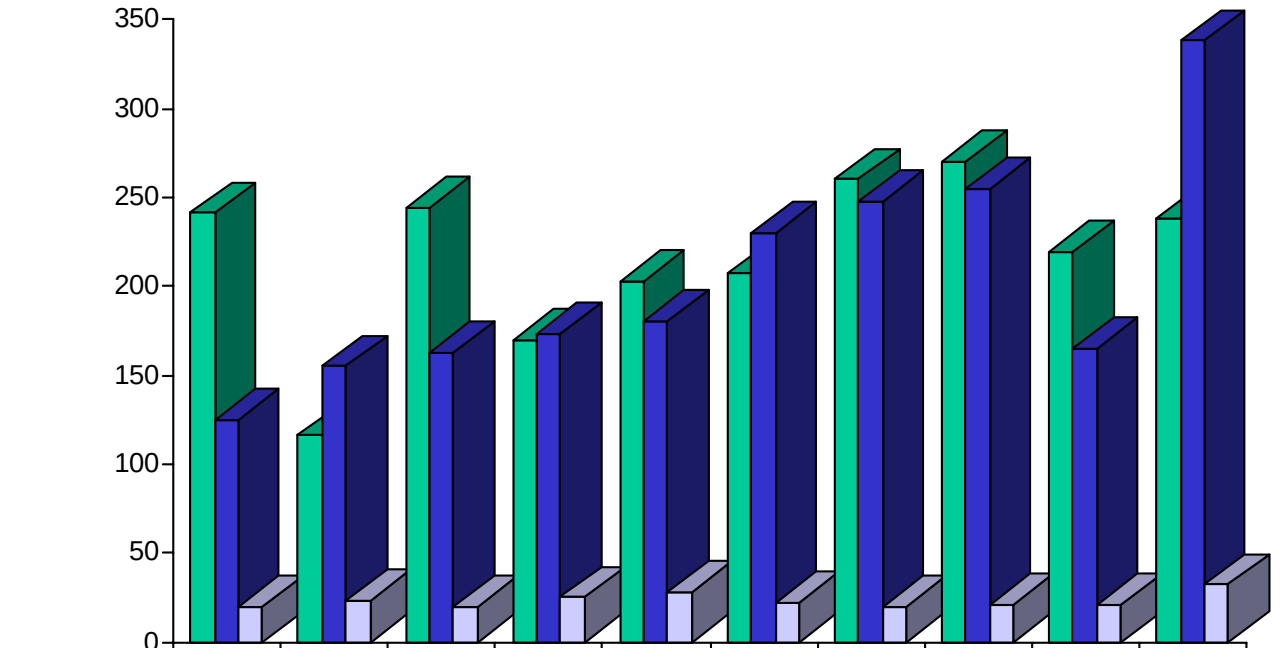


International Collaboration

International collaboration

- User facilities
  - Open to all researchers based on independent review of proposals;
  - Instrumentation partnership;
- International agreements
  - Cooperative research;
  - Exchange agreements;
- Collaboration
  - Scientist to scientist;
  - Approximately 50 joint publications annually.

International cooperation & exchange



	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Go abroad	241	116	244	170	203	207	260	270	219	238
Visit IOP	125	155	163	173	180	230	248	255	165	338
Countries	20	23	20	25	28	22	20	21	21	32

2003 SARS

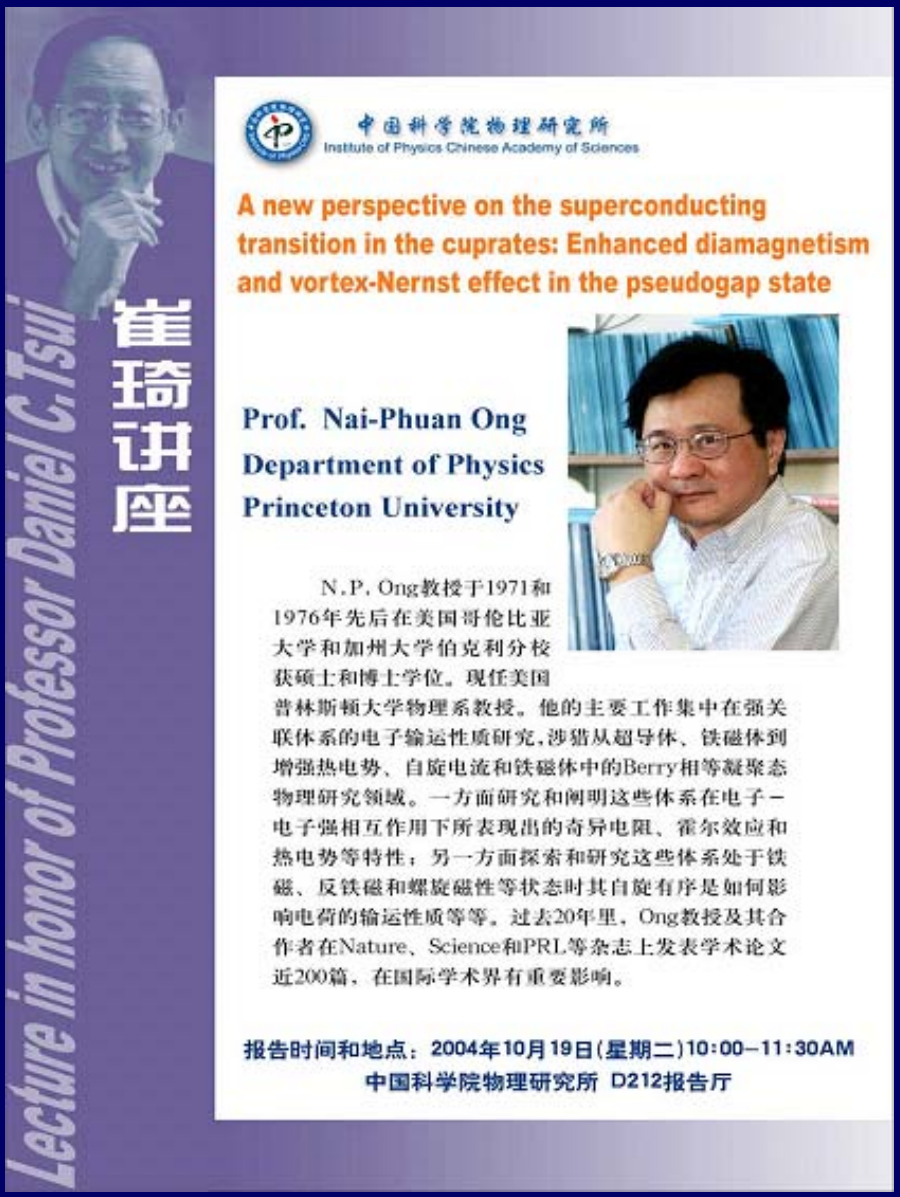
Prof. Tord Claeson, Chairman of the Nomination and Selection Committee for the Nobel Prize in Physics of the Royal Swedish Academy of Sciences visiting the Institute.

Visit by R.Laughlin, Nobel Prize winner and Professor at Stanford University.

H. Rohrer, Nobel Prize winner and research scientist at IBM. Zurich laboratory in Switzerland,visiting the institute.

Daniel C. Tsui, Nobel Prize winner, being elected visiting professor in his visit , and a series lecture, *Daniel C. Tsui's Lecture* , was initiated after his name.

Daniel C. Tuis's Lecture (2004 -)



* **Prof. Nai-Phuan Ong**

  Princeton Univ., 2004

* **Prof. Sankar Das Sarma**

  Univ. of Maryland, 2005

* The ZhongGuanCun Forum

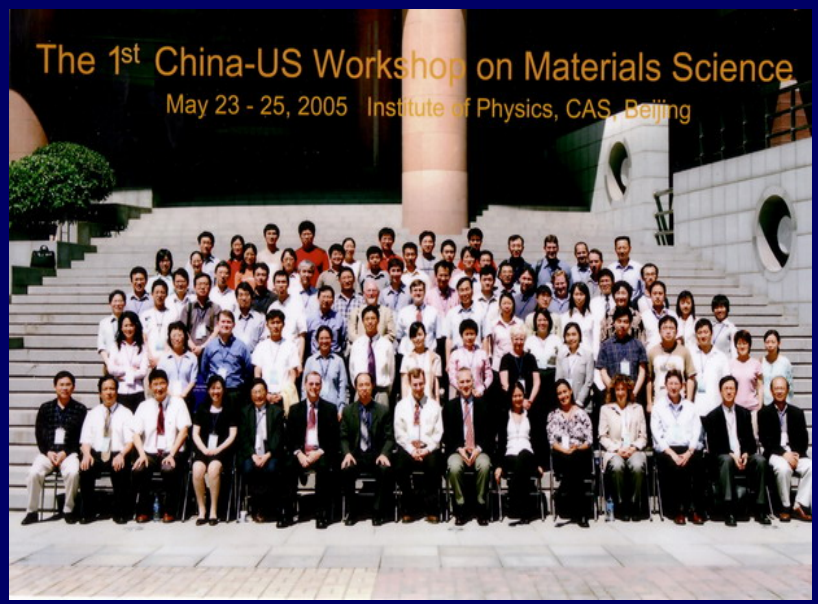
  on Condensed Matter Physics: 65 (once/month)

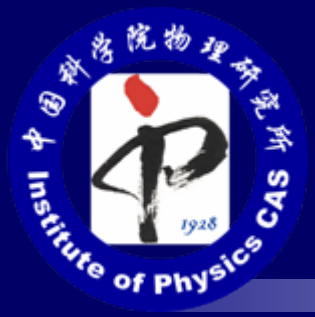
  (K.Takanashi,R. Snyder, H.J. Dai,T.C. Chiang, S.G. Louie, …)

* The Advanced Physics Forum: > 100 (twice/month)

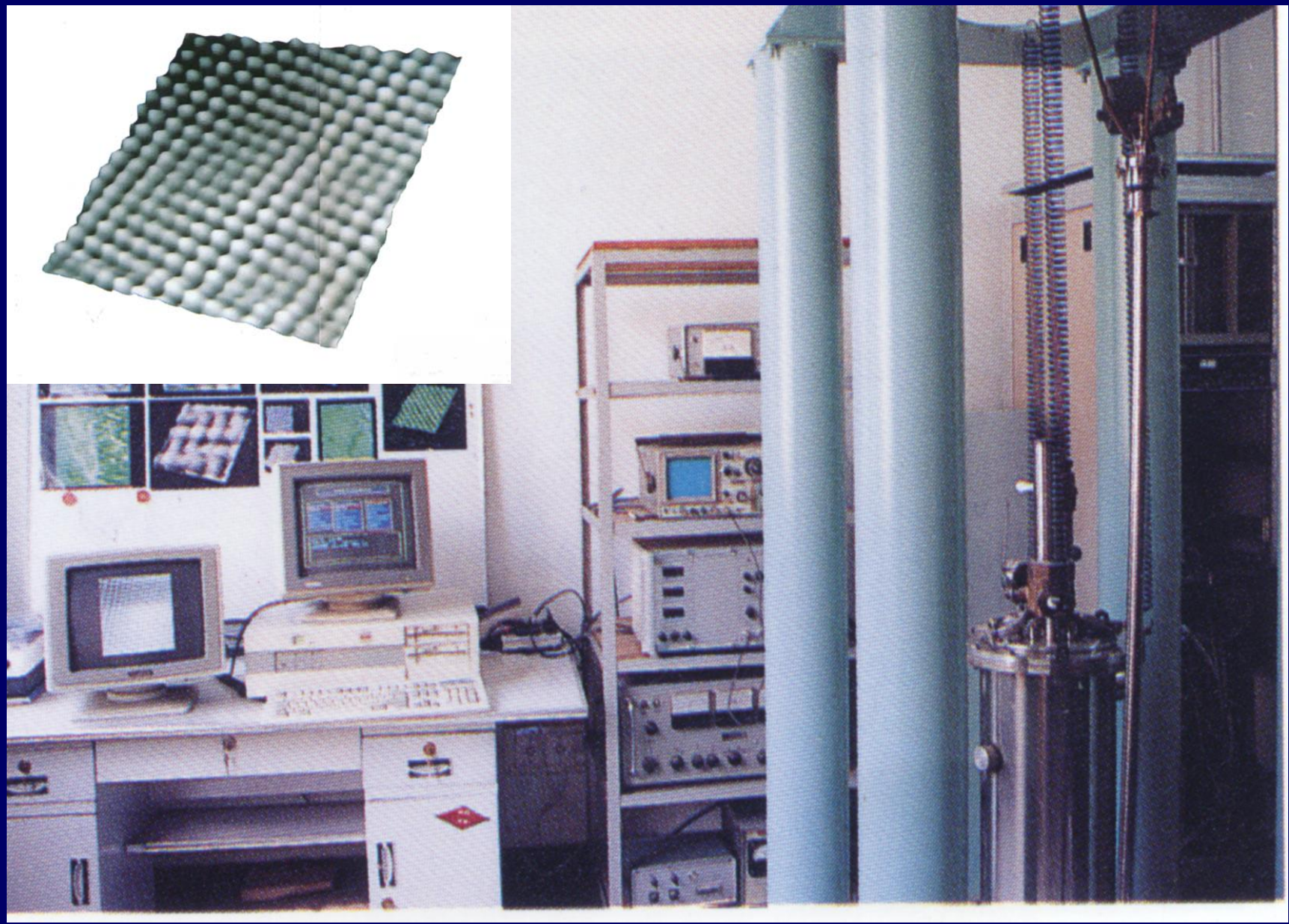
* Working Lunch: (twice/month)

* ~ 10 intl confs./year and ~ 10 intl workshops/year



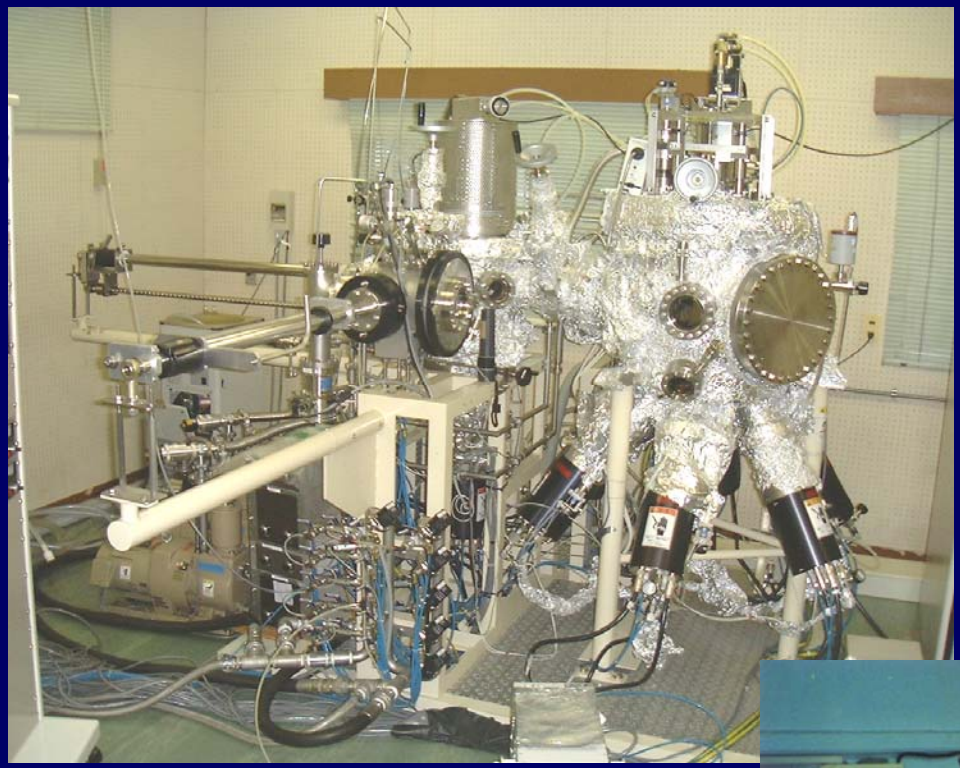


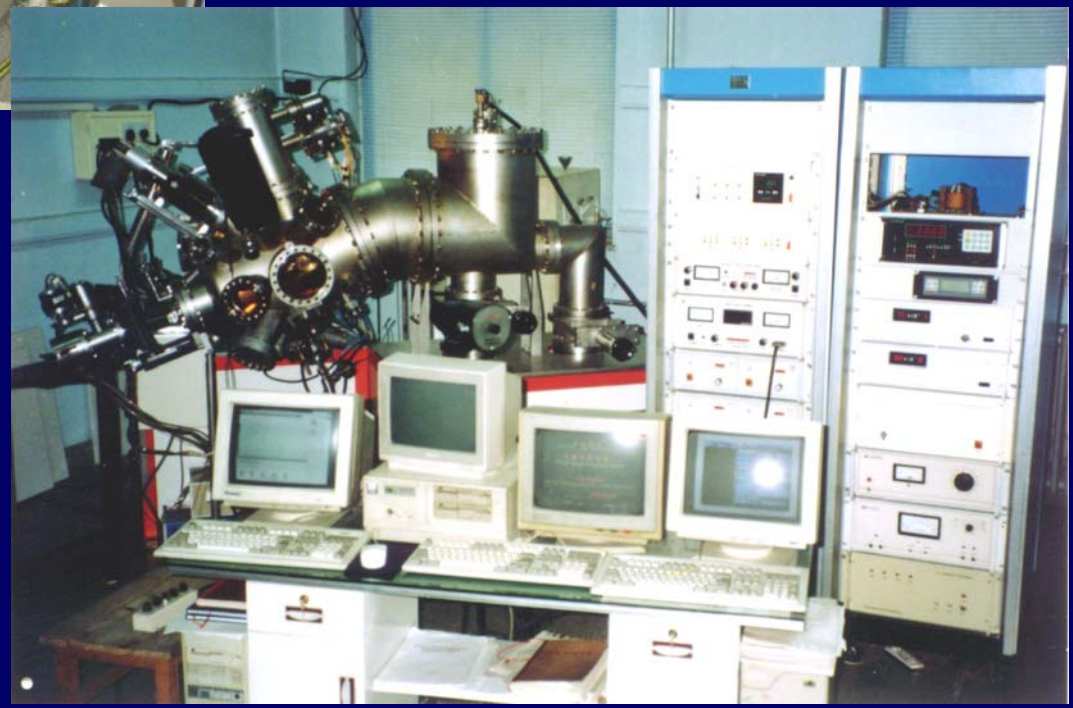
Facilities



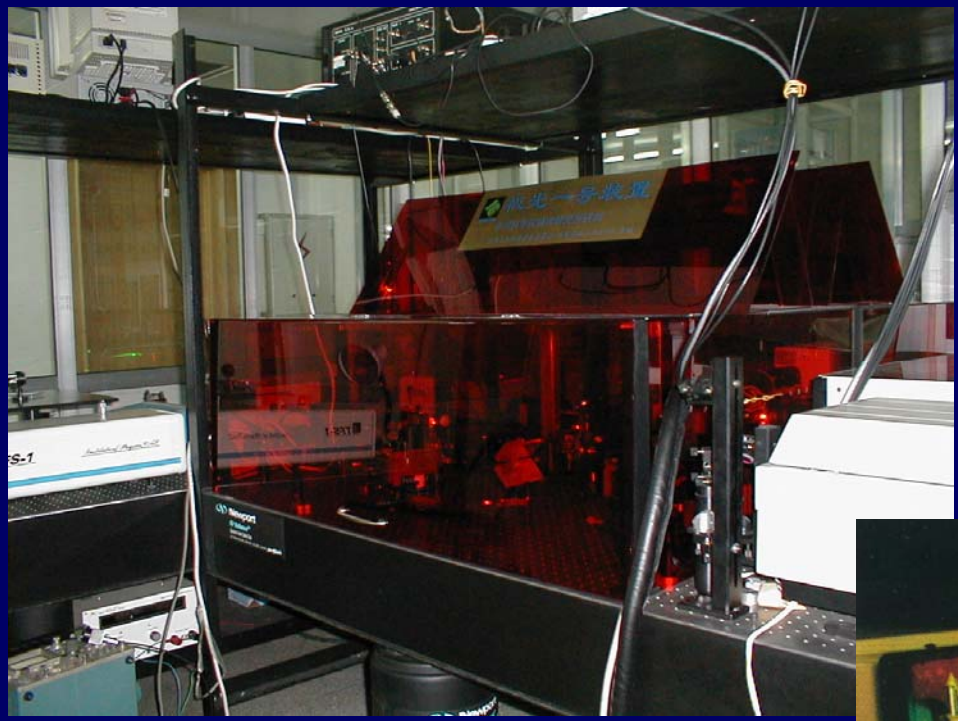
Low temperature scanning tunneling microscopy

Thin Film Deposition Systems





Laser-molecular beam epitaxy system

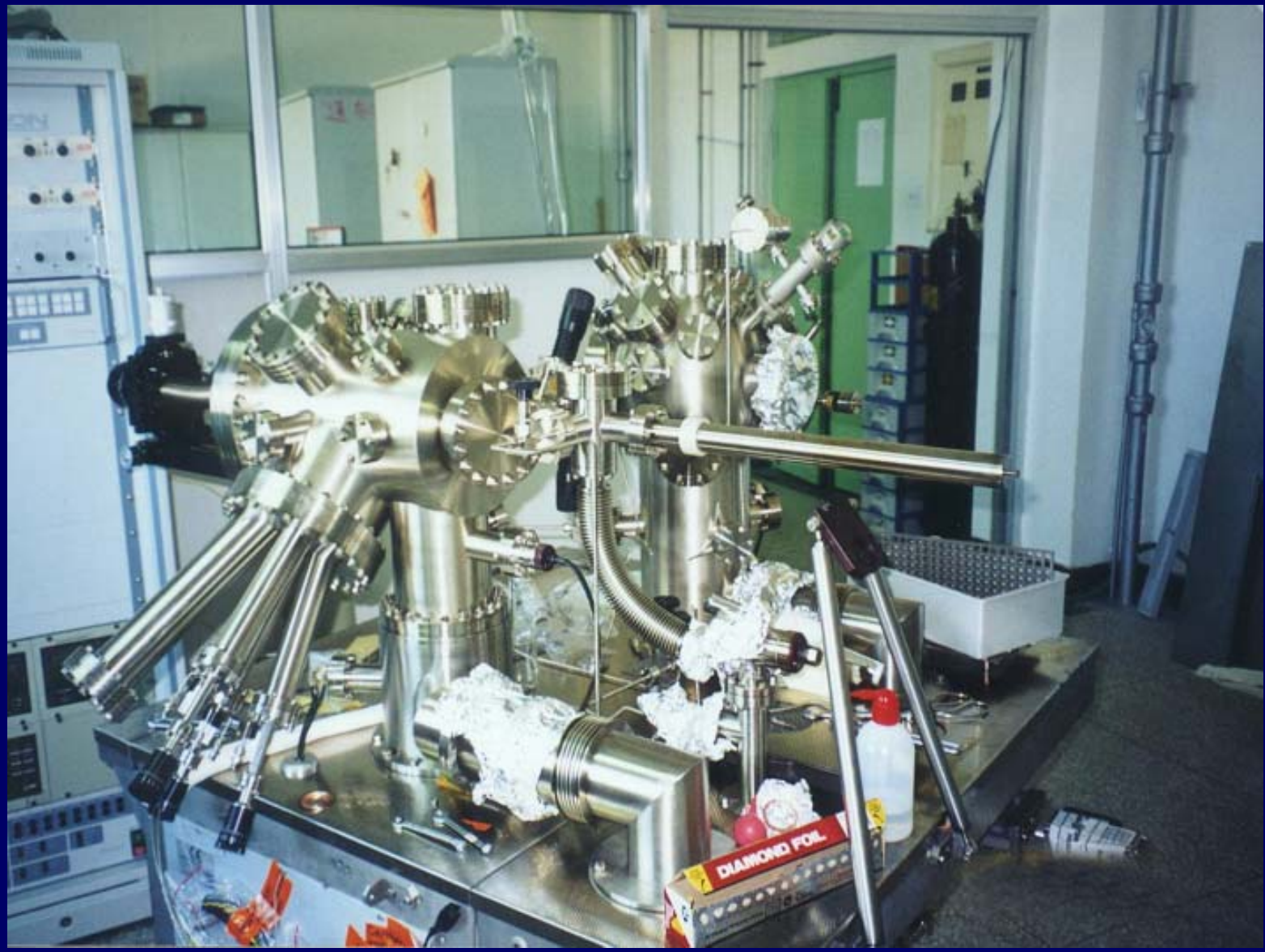


“ Jiguang I” laser equipment

Multi-wavelength optical parametric laser

建成20TW级的飞秒激光装置聚焦功率密度超过$10^{19}W/cm^2$成为世界上为数不多的可以进行相对论光强实验的装置

640mJ/30fs, 20TW=$2x10^{13}$W, 聚焦功率密度>$10^{19}W/cm^2$



Omicron temperature variable scanning tunneling microscopy and molecular beam epitaxy combined system

UHV-VT-STM-MBE

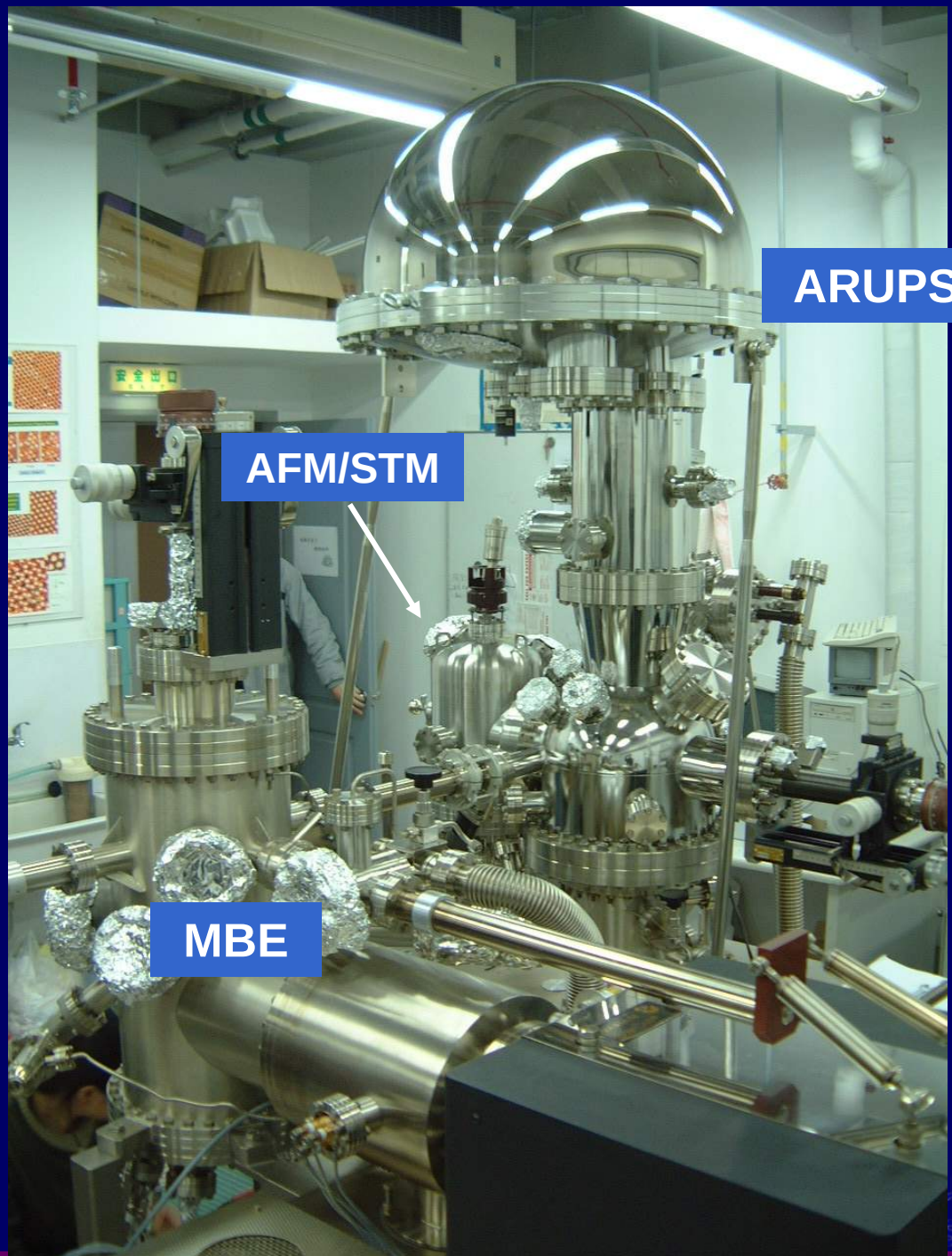
AFM/STM-MBE-ARUPS System

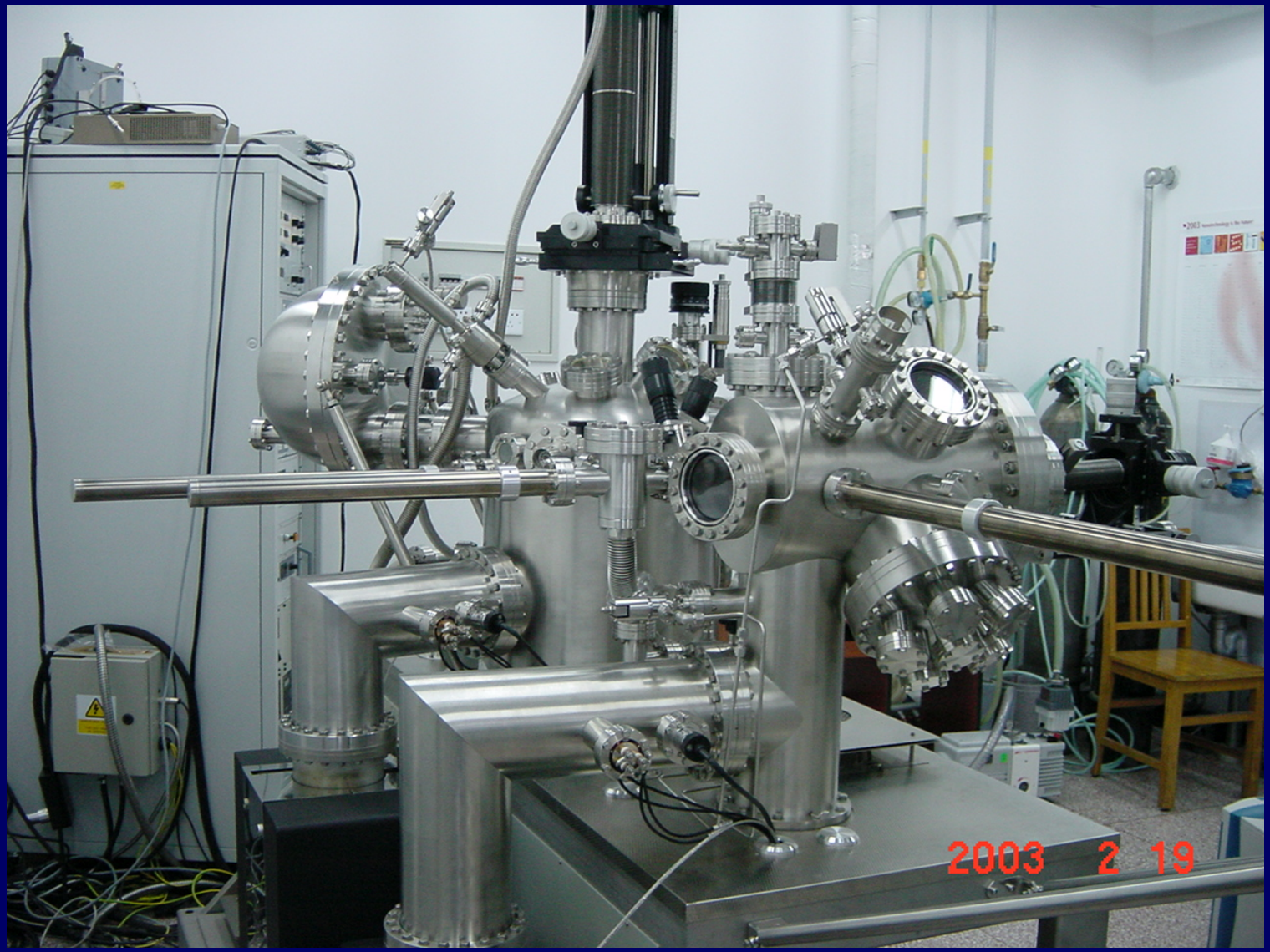
AFM: beam reflection

Temperature：

28K-1000K

能量分辨: ＜2meV





UHV-HREELS-UPS-STM-MBE System

Ultra-Low Temperature – High Magnetic Field – Dual Tip UHV STM/STS system

1 Independent dual tip STM with position sensor;
2. The sample can be rotated continuously with respect to magnetic field;
3 Exchangeable dual tip STM head;
4 By using optical windows, magnetic-optical measurement and characterization of optical properties of nano-structures underextreme conditions can be carried out.
5 Transport measurement can be performed.

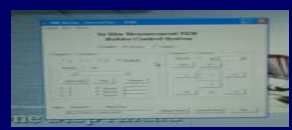
Intergrated High-Resolution TEM-SPM System

The TEM is equipped with EELS and EDS, by which the microstructure, electronic structure, phononic structure and chemical composition of nano-object can be measured. The SPM has two tips for in-situ manipulations and property measurements.

STM Mechanical Unit

STM Controller

STM Tip Manipulator



Central Processor

Physical Measurement

Ultra-low temperatures
Strong magnetic fields

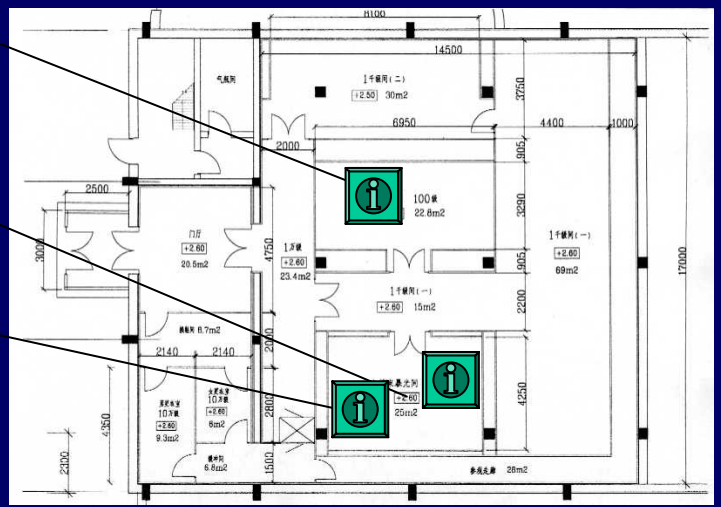
(17 mK, 10 T)

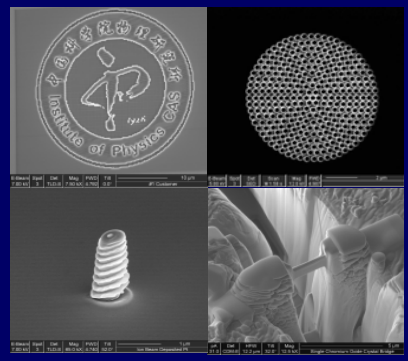
Micro-fabrication laboratory

Photolithography: < 500nm

EBL System: < 50nm

FIB System: < 7nm



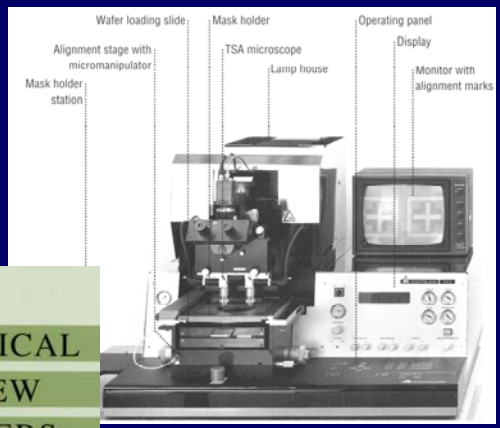


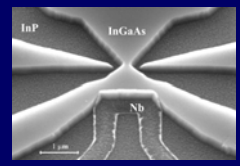
Photolithograpgy --- MA6

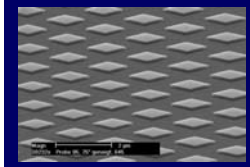
DB 235M Resolution: 7 nm

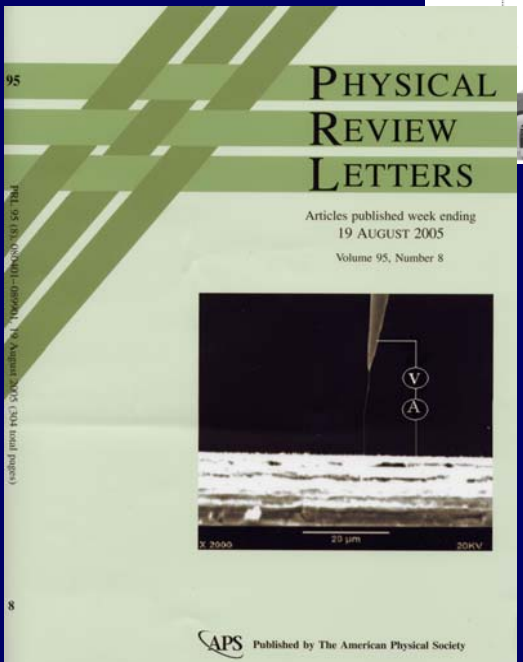
Micro-fabrication laboratory

每年举办培训班全国各地350人



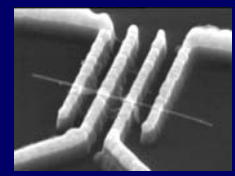


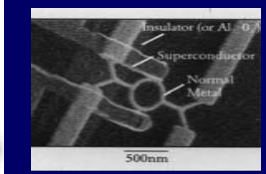




Photolithograpgy --- MA6

Resolution: < 500 nm

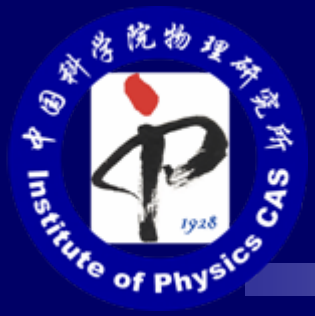




EBL --- Raith 150

Resolution: better than 50 nm

Institute of Physics



Campus Life

Campus of the Institute

Guest house & dinning hall

Conference Room and Main Hall in Duilding D

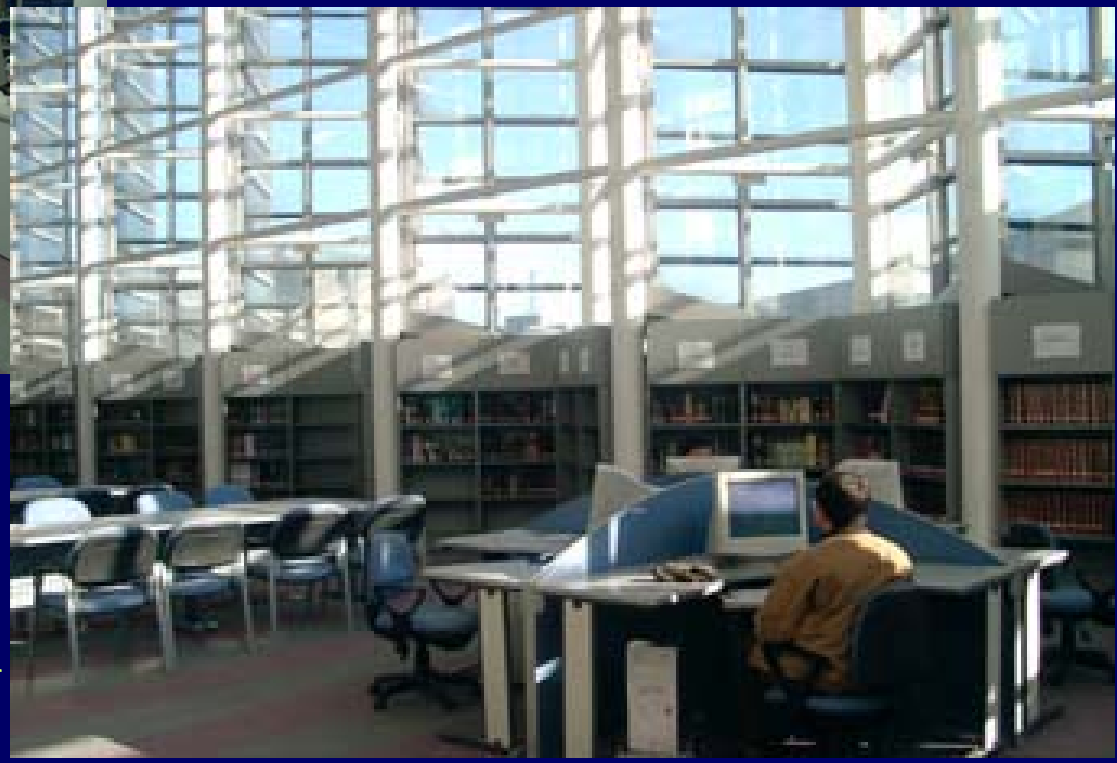
About 250000 volumes of collection books

About 3000 kinds of electronic journals

About 1042 kinds of collection journals

About 200 kinds of journal subscriptions

Free Internet



library & reading room

The top universities in China (Physics)

(Oct. 11, 2003 By CCTV News)

Institutes and Universities	Standard	
	Rank	Mark
Institute of Physics, CAS	1	96.97
Peking University	2	92.64
Nanjing Univeristy	3	90.28
Chinese University of Sci. & Tech.	4	88.08
Fudan University	5	85.6
Institute of Optical Physics, CAS	5	85.6
Tsinghua University	7	82.59
Institute of Engineering Physics	8	81.37
Shichuan University	9	80.95
Nankai University	10	77.26

Beijing National Lab for Condensed Matter Physics (2003-)

Lab for Magnetism
Lab for Superconductivity
Lab for Surface Physics
Lab for Optical Physics
Lab for Electron Microscopy
Lab for Nano-Physics & Nano-Technology
Lab for Physics in Extreme Conditions
Lab for Soft Matter Physics
Lab for Condensed Matter Theory & Materials Computation
Lab for Microfabrication
Lab for Quantum Information & Quantum Computing

International Center for Quantum Structure (ICQS)

Beijing Spallation Neutron Source (BSNS) (2005 -)

The mission of IPCAS is to foster scientific progress by bringing together top-notch researchers in an open and stimulating environment.

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