Chuan C. Chang
Patents, PhD Thesis, Articles, & Abstracts
Partial List

Patents

(7) Nitrided Silicon Dioxide Layers for Semiconductor Integrated Circuits, Nov. 18, 1986
Patent 4,623,912

(6) Method of Fabricating MOS Field Effect Transistors, Apr. 13, 1982
Patent 4,144,634

(5) Method of Cleaning Test Probes, Feb. 9, 1982
Patent 4,314,855

(4) Gold-Tin-Gold Ohmic Contact to N-Type Group III-V Semiconductors, Dec. 18, 1979
Patent 4,179,534

(3) Fabrication of Gallium Arsenide MOS Devices, Mar. 20, 1979
Patent 4,144,634

(2) Technique for Preparation of Stoichiometric III-V Compound Semiconductor Surfaces, May 31, 1977
Patent 4,026,741

(1) Light Sensitive Storage Device Including Diode Array and Method for Producing the Array, Aug. 29, 1972
Patent 3,687,745

Publications

(1) Low Energy Electron Diffraction

http://rsi.aip.org/resource/1/rsinak/v42/i2/p189_s1?isAuthorized=no
LEED Optics as Electron Mirror Microscope

http://jap.aip.org/resource/1/japiau/v39/i12/p5570_s1?isAuthorized=no
LEED Studies of the (0001) Face of α-Alumina

http://jes.ecsdl.org/content/115/4/354.abstract
LEED Studies, Adsorption of Carbon Monoxide on the Tungsten (112) Face

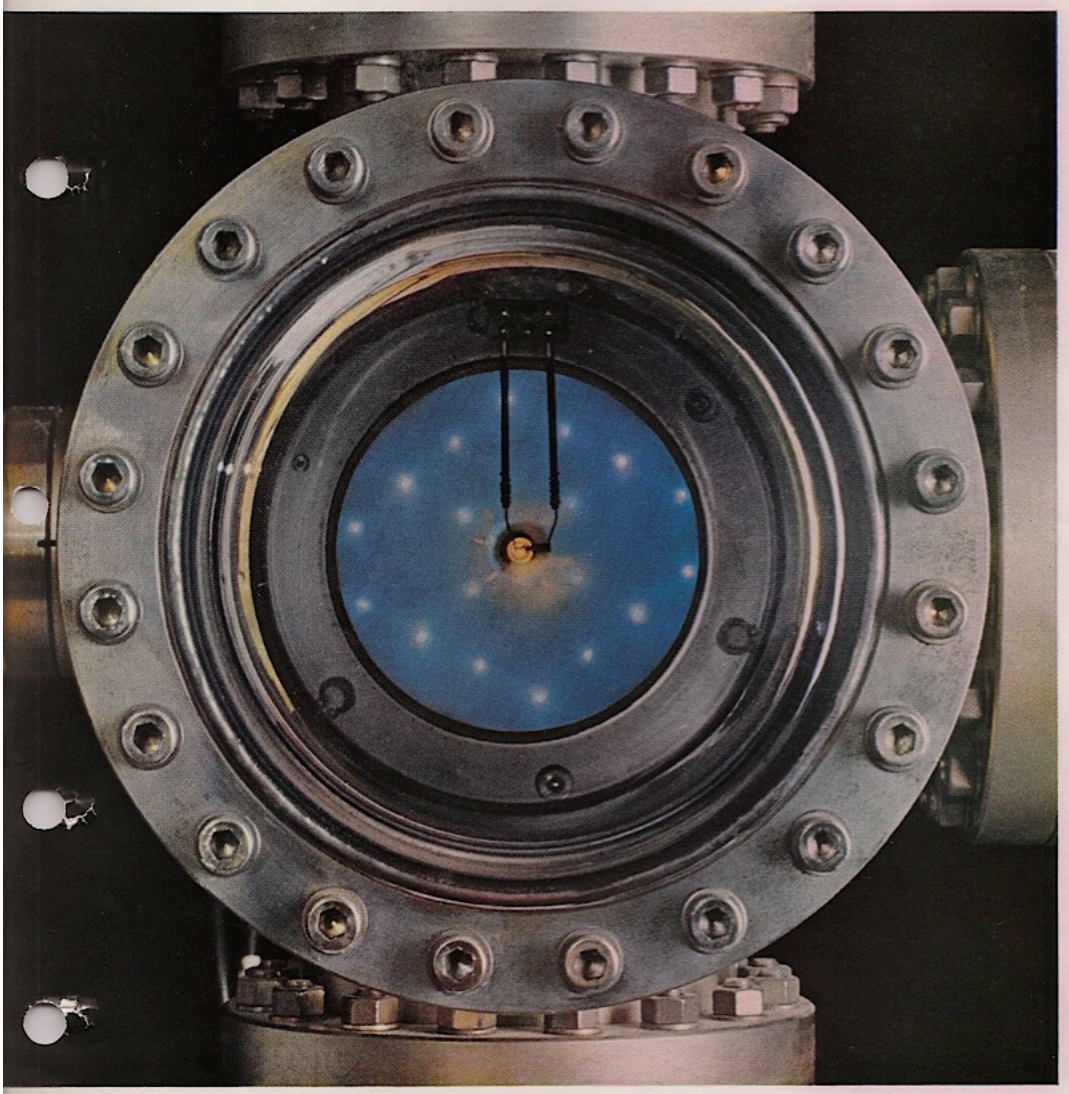
(2) PhD Thesis (large file): "Low Energy Electron Diffraction Studies, Adsorption of Oxygen, Carbon-Monoxide and Nitrogen on the Tungsten (112) Face".

http://adsabs.harvard.edu//abs/1967PhDT.....55C

The instrument I built for this thesis (with Varian Associates) was featured on the cover of Scientific American (next page).

Not shown are the vacuum pumping system consisting of two Vacion pumps, a mercury diffusion pump, a liquid nitrogen cryo-pump backed by a mechanical pump, and a baking hood that can heat the entire system to over 200 degrees C, thus achieving one of the highest vacuums ever produced on earth.

SCIENTIFIC AMERICAN



THE STRUCTURE OF CRYSTAL SURFACES

SIXTY CENTS

March 1965

Above Photo: Low Energy Electron Diffraction apparatus: The blue screen is a phosphor that lights up when hit by electrons; the white spots are electrons representing the reciprocal lattice of the single crystal tungsten welded between the vertical rods.

The chamber is under ultra-high vacuum comparable to that on the moon. A narrow beam of electrons is shot out of a gun (center bright object) at a known energy and are backscattered from the crystal towards the screen; instead of a uniformly bright screen, you get spots because electrons are waves and "diffract" from the tungsten crystal in a pattern that can be calculated exactly. This is the original phenomenon that led to the discovery of the wave nature of matter and a Nobel prize. How a SINGLE electron "sees" so many atoms at once and diffracts remains a mystery to this day; diffraction is a single-particle event.

Since we know the wavelength of the electron from its energy, the distance between spots tells us the distance between tungsten atoms and the pattern of spots tells us how the tungsten atoms are arranged on the surface. The size of the spots, which is much larger than the diameter of the electron beam, tells us how many tungsten atoms each electron "sees"; in this case, over 10,000 surface atoms. Since most of the electrons are scattered by just one or two layers of atoms, we can now "see" just the topmost atom layer of a surface -- we have atomic depth resolution!

(3) Auger Spectroscopy

http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=4846849
Intensity variations in Auger spectra caused by diffraction

http://www.sciencedirect.com/science/article/pii/003960287190210X
Auger Electron Spectroscopy

Auger Electron Spectroscopy in
Characterization of Solid Surfaces

(4) Semiconductors

Semiconductors, Fabrication and Characterization, in
Encyclopedia of Semiconductor Technology, Wiley, 1984

http://jes.ecsdl.org/content/124/6/922.abstract
Anodic Oxide on GaAs: Quantitative Chemical Depth Profiles Obtained Using Auger Spectroscopy and Neutron Activation Analysis

http://www.sciencemag.org/content/245/4916/391.abstract
GaAs Clusters in the Quantum Size Regime: Growth on High Surface Area Silica by Molecular Beam Epitaxy

http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=4952743
Chemical preparation of GaAs surfaces and their characterization by Auger electron and x-ray photoemission spectroscopies

http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=5081499
Co/GaAs interfacial reactions

http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=4859117
Electronic passivation of GaAs surfaces through the formation of arsenic—sulfur bonds

http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=5086280
Enhanced electronic properties of GaAs surfaces chemically passivated by selenium reactions

http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=4856871
Epitaxial growth of GaAs/NiAl/GaAs heterostructures

http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=5101156
Interdiffusions in thin-film Au on Pt on GaAs (100) studied with Auger spectroscopy

http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=4861404
Ni-InP reaction: Formation of amorphous and crystalline ternary phases

http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=4856912
NiAl/n-GaAs Schottky diodes: Barrier height enhancement by high-temperature annealing

http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=4956076
Silicon-on-Sapphire Epitaxy by Vacuum Sublimation: LEED–Auger Studies and Electronic Properties of the Films

http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=4966237
Structure and stability of passivating arsenic sulfide phases on GaAs surfaces

http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=4849348
Thermal oxidation of hafnium silicide films on silicon

http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=1478461
Transmission electron microscopy of cross sections of large scale integrated circuits

http://prl.aps.org/abstract/PRL/v57/i2/p249_1
Unusually Low Surface-Recombination Velocity on Silicon and Germanium Surfaces

http://avspublications.org/jvsta/resource/1/jvtad6/v6/i3/p1456_s1?isAuthorized=no
Studies of Co/Ga1−xAlxAs interfaces fabricated in ultrahigh vacuum

http://jes.ecsdl.org/content/127/8/1787.short
The Growth and Characterization of Very Thin Silicon Dioxide Films

http://jes.ecsdl.org/content/126/11/1951.abstract?related-urls=yes&legid=jes;126/11/1951
Effect of Growth Parameters on the CVD of Boron Nitride and Phosphorus-Doped Boron Nitride

http://ieeexplore.ieee.org/xpl/login.jsp?tp=&arnumber=109528&url=http%3A%2F%2Fieeexplore.ieee.org%2Fiel1%2F2220%2F3327%2F00109528.pdf%3Farnumber%3D109528
Dry-etching process for the fabrication of optoelectronic gratings in III-V substrates

(5) Superconductors

http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=4856026
Pulsed laser etching of high Tc superconducting films

http://jap.aip.org/resource/1/japiau/v61/i11/p5089_s1?isAuthorized=no
Auger electron spectroscopy, transmission electron microscopy, and scanning electron microscopy studies of Nb/Al/Nb Josephson junction structures

http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=4857506
As-deposited high Tc and Jc superconducting thin films made at low temperatures

http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=5085237
Doping mechanism in Bi(Pb)-Sr-Ca-Cu-O superconductors

http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=4857443
Low-temperature preparation of high Tc superconducting thin films

http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=4858680
Microstructure of in situ epitaxially grown superconducting Y-Ba-Cu-O thin films

http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=4857684
Nature of the pulsed laser process for the deposition of high Tc superconducting thin films

http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=4858794
Optical spectroscopy: An in situ diagnostic for pulsed laser deposition of high Tc superconducting thin films

http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=4846419
Plasma oxidation of aluminum film on GaAs—A study by Auger spectroscopy and transmission electron microscopy

http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=4861876
Structural perfection of Y-Ba-Cu-O thin films controlled by the growth mechanism

http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=5082843
Substrate effects on the properties of Y-Ba-Cu-O superconducting films prepared by laser deposition

http://apl.aip.org/resource/1/applab/v57/i17/p1814_s1?isAuthorized=no
Origin of surface roughness for c-axis oriented Y-Ba-Cu-O superconducting films

http://apl.aip.org/resource/1/applab/v56/i4/p400_s1?isAuthorized=no
Superlattices of Y–Ba–Cu–O/Yy–Pr_{1-y}–Ba–Cu–O grown by pulsed laser deposition

http://apl.aip.org/resource/1/applab/v53/i6/p517_s1?isAuthorized=no
Smooth high Tc Y1Ba2Cu3Ox films by laser deposition at 650 °C

http://apl.aip.org/resource/1/applab/v55/i11/p1138_s1?isAuthorized=no
Ferrimagnetic rare–earth orthoferrites: A new, magnetic substrate for the growth of epitaxial Y–Ba–Cu–O thin films

(6) Li Batteries

http://www.readcube.com/articles/10.1002%2Fchin.199243023
Low Temperature LiMn2O4 Spinel Films for Secondary Lithium Batteries

(7) Telephone Central Office

http://jes.ecsdl.org/content/142/9/3157.abstract
Monitoring of In Situ Corrosion Rates in a Telephone Switching Office in Burbank, California

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