

ATOMIC RESOLUTION WITH THE ATOMIC FORCE MICROSCOPE
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For biologic studies, atomic force microscopy (AFM) has been prevailing over scanning tunneling microscopy (STM) because it has the capability of imaging non-conducting biologic specimens. However, STM generally gives better resolution than AFM, and we're talking about resolution on the atomic scale. In a recent article, Franz Giessibl (Atomic resolution of the silicon (111)-(7X7) surface by atomic force microscopy, *Science* 267:68-71, 1995) has demonstrated that atoms can be imaged by AFM.

One of the factors limiting resolution with AFM is a relatively large interaction force between the scanning tip and the surface when the two materials are reactive. One way to avoid this problem is to examine the specimen in the presence of water that reduces the attractive van der Waals forces. However, when operating in ultrahigh vacuum, one can use an "ac" method or frequency modulation (fm) non-contact method because it has certain advantages over the contact mode. One advantage is that the tip does not touch the sample during imaging so there is no danger of chemical bonding between the tip and sample, a problem if the materials are reactive. Another important consideration is that the fm method is sensitive to force gradient rather than the force; this increases the sensitivity to forces that are spatially dependent on the atomic scale. Using non-contact AFM, Giessibl was able to achieve atomic resolution in ultrahigh vacuum using the AutoProbe VP 900 (Park Scientific Instruments). This instrument uses a very clever cantilever that changes its resistance when strained so that the cantilever is actually a piezoresistive mechanism.

Images of silicon (111)-(7X7) surfaces were published in Giessibl's article, and the results are similar to those using STM. The resolution was shown to be 6 Ångstroms lateral, and an impressive 0.1 Ångstroms vertical. It might be suggested that we are approaching the limits of resolution with non-contact AFM but I, for one, would be loath to suggest that. I would rather not-so-patiently wait to see what the future will bring. ■

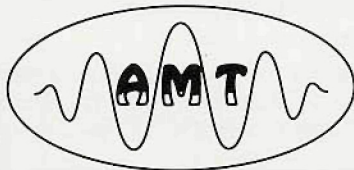
1. The author gratefully acknowledges Drs. John Patrin and Anita Wahi, Park Scientific Instruments, Sunnyvale, CA 94089, for reviewing this article.

Temporary fix for Corona Problems
 Sterling Newberry

On older microscopes or experimental high voltage setups, Corona can be an annoying source of electrical noise. It can arise from sharp points or semiconducting surface areas. If polishing and cleaning the surface does not stop it, then the offending area can be pacified by applying silicone potting gel although this has the disadvantages of a short shelf life, messy to apply on an open area, and difficult to remove. I prefer to use what once was a common laboratory wax, described in older issues of *The Chemical Rubber Hand Book of Chemistry and Physics* in the section on Laboratory arts and recipes*. It is an equal mixture by weight of Bee's wax and Rosin and is a good general purpose laboratory wax. It has good adhesion to most surfaces. It has to be warmed slightly to make it pliable enough to shape by hand. Increase the bee's wax content and it will become pliable at body temperature. It is particularly useful for corona on a high voltage resistor string because the rosin makes it a good solder flux, thus it does not have to be completely removed in order to replace a resistor. The bulk of the wax can be removed when required by scalpel blade, alcohol torch or heat gun and the remaining film cleaned off by hot water or most solvents. It is to be used to suppress corona in air or vacuum but not in oil submerged equipment.

*See for example the 34th edition (1952-1953) pg 2775 where it is listed as a vacuum wax. However recall that minus 6 Torr was good demountable vacuum practice in those days. Sterling Newberry

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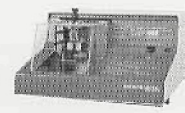
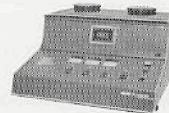
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COMING EVENTS

- ✓ June 2/3 '95: **Computers and Microscopy Workshop (MSEM)**. Madison, WI. Grayson Scott: (608)262-2993, Fax: (608)262-7306
- ✓ June 4/7 '95: **22nd Annual Meeting of the Microscopical Society of Canada**. Univ of Ottawa. Shea Miller, Tel.: (613)957-4347 X-7709, Fax: (613)943-2353.
- ✓ June 6/9 '95: **3rd Annual Symposium on AFM & STM (US Army Natick RD&E Ctr. Natick, MA)**. Samuel Cohen: (508)651-4578
- ✓ June 7/9 '95: **Immunocytochemistry and Image Analysis for Confocal and Electron Microscopy (Geo. Washington Univ. 21st Annual Program)**. Washington, DC. Fred G. Lightfoot (202)994-2881, Fax: (202)994-8885.
- ✓ June 12/22 '95: **Lehigh Microscopy Courses - SEM, X-ray Analysis, AEM, AFM**. Bethlehem, PA. Prof. David B. Williams, Tel.: (610)758-5133, Fax: (610)758-4244.
- ✓ June 15/17 '95: **Microwave Workshop**. (Ted Pella, Inc.) California State Univ. Chico, CA. Rick Giberson: Tel.: (800)237-3526 (US) or (800)637-3526 (CA), Fax: (916)243-3761.
- ✓ June 19/23 '95: **MICRO ONE - Intensive Course in Light Microscopy (Gordon Grau Scientific)**. Kissimmee, FL. Barry Fookes: Tel./Fax: (407)931-1975
- ✓ June 26/30 '95: **Congres "Trinoculaire" de Microscopies Electroniques. Joint Meeting SBM, SFME, SGOEM**. Details: P.A. Buffat, EPFL-CIME. Fax: +41 21 693 44 01, eMail: philippe.buffat@cime.epfl.ch
- ✓ June 26/30 '95: **Computer Simulation and Processing of HRTEM Images**. NCEM, Lawrence Berkeley Lab., Berkeley, CA. Michael A. O'Keefe, eMail: MAOK@LBL.GOV.
- ✓ June 26/30 '95: **11th Annual Short Course on Molecular Microspectroscopy**. Oxford, OH. (513)529-2873
- ✓ July 3/6 '95: **CYTO 95 - The Application of the Microscope in Life Sciences (RMS)**. Univ. of Southampton. Tel.: 0865 248768, Fax: 0865 791237
- ✓ July 10/13 '95: **INTER/MICRO '95**. McCrone Research Institute. Chicago, IL. Nancy Daerr, Tel: (312)842-7100, Fax: (312)842-1078
- ✓ July 10/Aug 4 '95: **Estuarine Fish Ecology (U. of S. Carolina short course)**. Georgetown, SC. Kitty Harper: (803)777-2692.
- ✓ August 6/11 '95: **Microbeam Analysis Society (MAS) National Meeting**. Breckenridge, CO. Gregory Meeker, Tel.: (303)236-1081, Fax: (303)236-1414.
- ✓ August 6/11 '95: **XIVth International Pflerkorn Conference on the Science of Biological Specimen Preparation for Microscopy and Microanalysis**. Belleville, IL. Marek Malecki: (608)263-8481, Fax: (608)233-2400.
- ✓ August 13/17 '95: **Microscopy Society of America/Histochemical Society Annual Meeting**. Kansas City, MO. (800)538-3672, Fax: (508)548-9053.
- ✓ August 29/Sept 2 '95: **14th International Congress on X-ray Optics & Microanalysis**. GuangZhou, China. Tel.: 8620-777-5213, Fax: 8620-777-5791.
- ✓ Sept '95: **1st International Conference of Electron Microscopy and Advances in Research in Different Fields of Science**. Ismailia - Egypt. Dr. Khalifa Ibrahim Khalifa: Phone/fax: (20)64-329478.
- ✓ Sept 2/6 '95: **3rd Interamerican Congress of Electron Microscopy**. Caxambu MG, Brazil. Elliot Kitajima, Tel.: 55-61-3482424, Fax: 55-61-3499094.
- ✓ Sept 4/8 '95: **Microscopy Conference '95 (NZSEM)**. Dunedin, New Zealand. Allan Mitchell, 64 3 479 7301, Fax: 64 3 479 7254
- ✓ Sept 26/Oct 2 '95: **14th International EM Congress**. Cancun, Mexico. Miguel Jose Yacaman: 525-570-85-03 Fax: 525-570-85-03
- ✓ Sept 26/30 '95: **OIM Academy - EBSP & Orientation Imaging Microscopy (TSL, Inc.)**. Provo, Utah. David Dingley: Tel: (801)344-8990, Fax: (801)344-8997.
- ✓ Sept 29/Oct 1 '95: **Symposium on Integrated Microscopy (Integrated Microscopy Resource, U of WI)**. Madison, WI. IMR, Univ. of Wisconsin, 1675 Observatory Drive, Madison, WI 53706
- ✓ Sept 29/Oct 1 '95: **14th Annual Advances in Microscopy Symposium "Microscopy Outreach: Conveying its Science, Art & Technology" (NCSMMA)**. Wrightsville, NC. Peter Ingram: (919)541-6598, Fax: (919)681-8419.
- ✓ Oct 9/13 '95: **Scanning Electron Microscopy and X-Ray Microanalysis for the Materials Scientist (SUNY - Inst. of Materials Science)**. New Paltz, NY. Dr. A.V. Patsis: Tel.: (914)257-3800, Fax: (914)255-0978.
- ✓ Oct 16/20 '95: **AVS Annual National Symposium**. Minneapolis, MN. Tel.: (212)248-0200, Fax: (212)248-0245.
- ✓ Oct 24/27 '95: **Ultramicrotomy in Materials Science (RMC and Univ. of Arizona)**. Tucson, AZ. Bob Chiovetti: (520)889-7900, Fax: (520)741-2200.
- ✓ Feb 5/9 '96: **14th Australian Conference on Electron Microscopy (ACEM-14) & 1st Meeting of the International Union of Microbeam Analysis Societies (IUMAS)**. Sydney, Australia. Maret Vesik: 61-2-351-2351, Fax: 61-2-552-1967

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