



Happy Holidays & a Nifty New Year

Popcorn, Diffraction and the Computer Revolution

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As is the case with many other aspects of our lives here in the twilight years of the twentieth century, the computer is having an ever more pervasive role in the daily endeavors of the electron microscopist. And as I contemplate the little button on the microwave that allows me to burn popcorn the exact same way, time after time, I am led to wonder "where is it all going?"...the technology that is. I know where the burnt popcorn will end up. Whether we like it or not, the computer is a tool that can drastically improve our productivity, and typically such productivity gains occur precisely within those tasks where mistakes are the most likely to creep in, to wit: the mundane and repetitive.

As an example, consider the task of indexing a diffraction pattern for a known crystal. In the far distant and superstitious past of the mid to late 1980's, this task required all sorts of strange alchemy. It began with the invocation of various gods during a ceremony termed "Loading the Camera". This was followed by a prayer and celluloid sacrifice to our Black and White Lady of Proper Exposure. Then came a secret ceremony in a darkened room wherein the recently produced sacred films were subjected to strange and vile potions, often accompanied by barely vocalized mutterings to the gods (or about the advisor). At this time presumably one's soul was appropriately cleansed and ready to embark on the arduous task of measuring d-spacings and angles, and comparing these to tables or calculating values in order to ascertain just what the heck this pattern is. When the task was complete, the shaken but triumphant microscopist would return home to his/her humble abode, open a beer and without even the benefit of a dedicated button, burn a

bag of microwave popcorn.

With the introduction of dedicated software for microscopy, tasks which were previously arduous and time consuming have been reduced to a brief series of routine calculations. The series of events described above is in fact still the norm in many facilities; however, present day technology is capable of transforming this procedure into something very different. Installing a computer and video capture board near the microscope allows the operator to bring a pattern into the computer and in a matter of minutes, index the pattern. In a similar fashion, the task of determining defect line directions, which previously took laborious manipulations of a Wulff net, is today fully automated in software. Throw an EDS system into the equation and we have the capability of identifying an unknown compound in a fraction of the time formerly required when using film and a card file. Diffraction patterns of all sorts, stereographic projections, Kikuchi maps and the like may all be generated for any orientation at the mere click of a button. There are even cases where the costs of computer hardware and software have been justified solely as a means of eliminating the darkroom and associated chemicals!

However, it must be remembered that although this wonderful technology is readily available, it cannot replace and is in fact useless, without the expertise of a trained microscopist. The people are the most valuable asset in the scientific community. Indeed, the cost of the investment in available technology pales into insignificance when contrasted with the cost of time wasted by not providing the appropriate tools to those with expertise to maximize their productivity. Unfortunately, although I am clearly able to recognize the benefit of modern technology, I have been unable to convince the boss that a new CD ROM drive, Gonzo Woofer Mark V computer speaker system and a Turbo Destructo-Blast SCSI joystick will have the desired effect on my productivity.

Ah well, at least I have a microwave with a button that allows me to burn popcorn the exact same way time after time. ■

Front Page Image

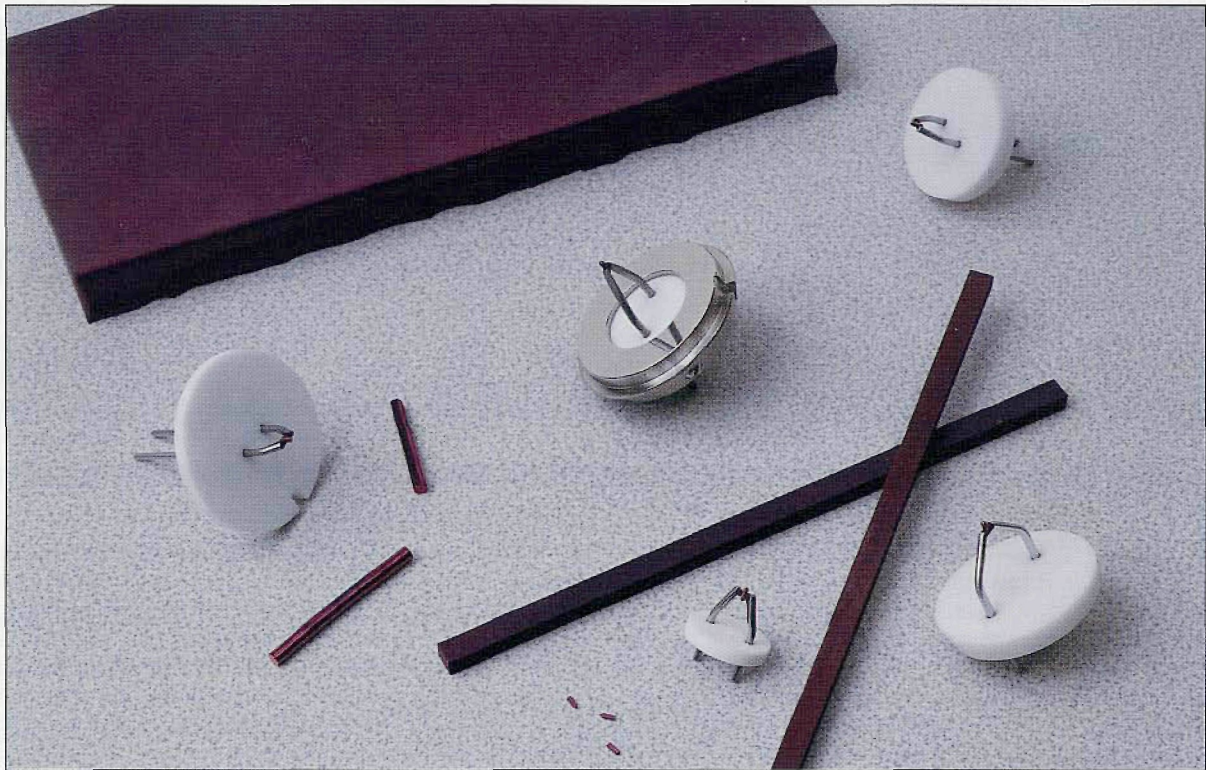
The cover image is a montage of three TEM diffraction pattern simulations produced using *Desktop Microscopist*. They are [0 0 0 1] patterns as would be produced by Ni - Nb Laves phase (space group #194, P63/mmc). The red background lines are a Kikuchi pattern, the blue ring of lines are a HOLZ pattern and the yellow spots are a SAD pattern. Camera lengths and accelerating voltage were chosen to maximize the aesthetics. By Virtual Laboratories, PO Box 14266, Albuquerque NM 87191, Tel.: (505)828-1640, Fax: (505)822-9759.

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LaBe Cathodes

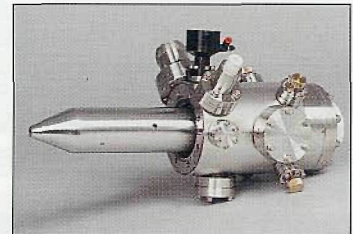
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