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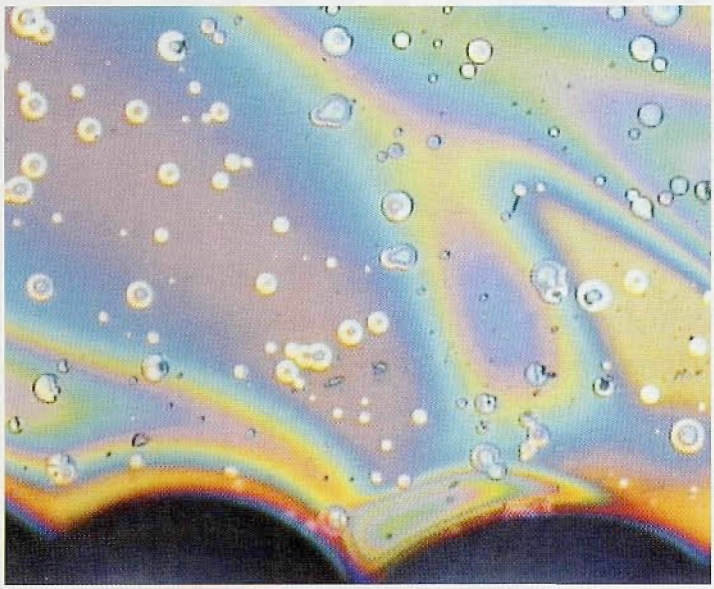

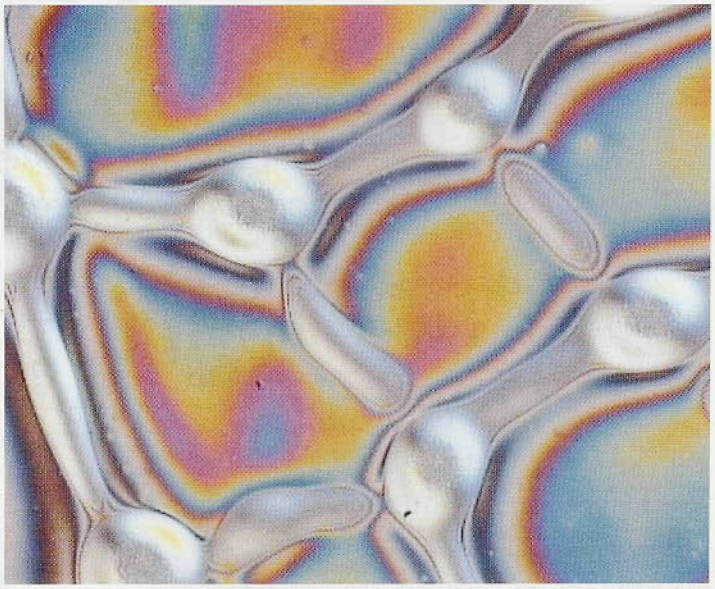

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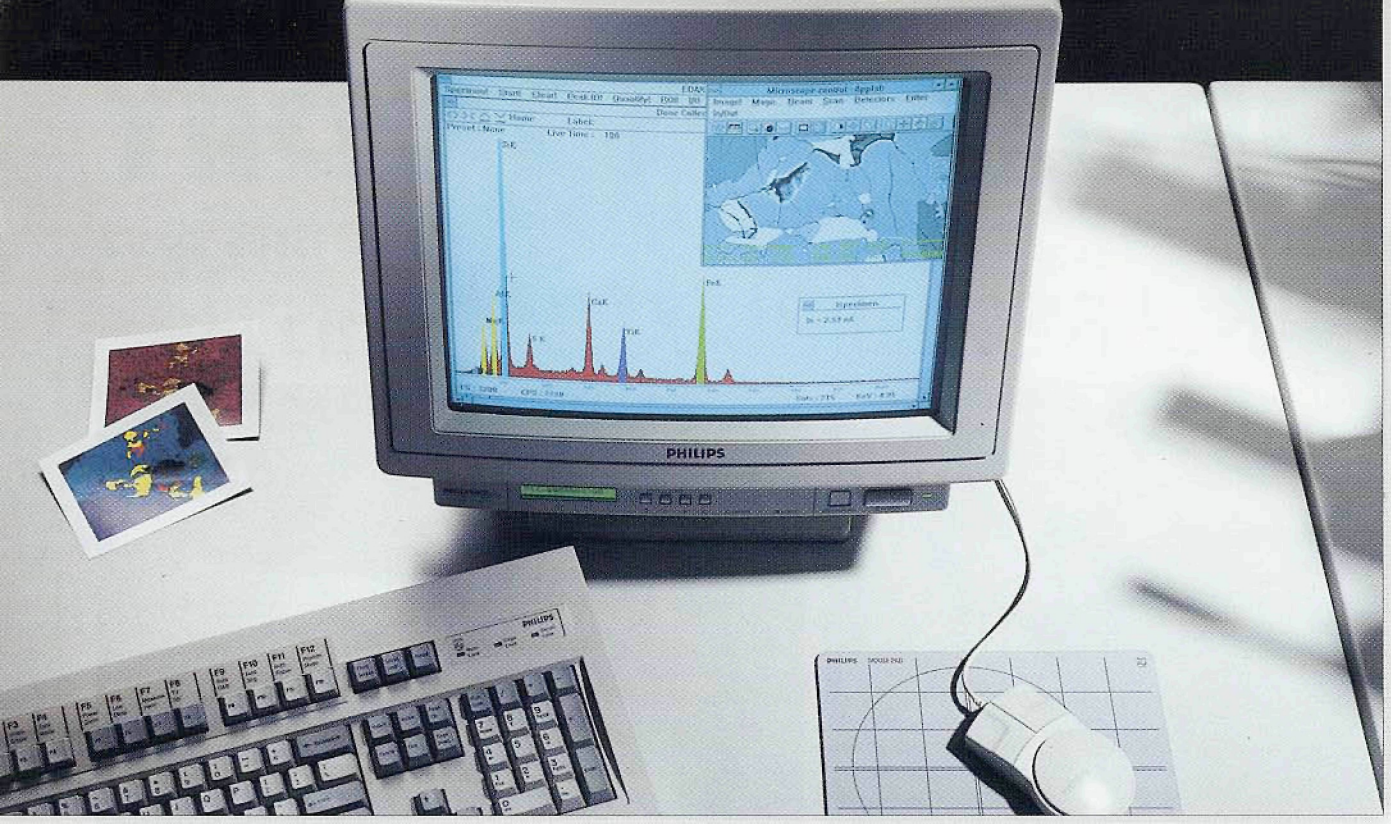

EO 95-03

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Circle Reader Inquiry #3

Scheduling Microscopy Assets

John Mansfield, University of Michigan

Here at Michigan our lab serves users from many departments (nuclear, materials, chemical, electrical, civil and mechanical engineering, physics, chemistry, geology, pediatric cardiology and pharmacy to mention a few) and they are spread out all over the city of Ann Arbor (about a 5 mile radius).

Since there are University computer sites all over campus and many people have Macintosh computers or can at least get access to them and there is a campus-wide Appletalk network, we use a simple scheduling system based on a collection of Hyercard stacks.

Each microscope, or other instrument that is scheduable, has a stack associated with it. These stacks are stored on a server in our lab and are accessible from anywhere on campus. Each stack is a basic calendar with the days of the week listed in four hour blocks for the daytime (8 to 5) and 8 hour blocks in the evening and at night. Clicking on any one block of time allows the user to book that entire block or part of it. The user needs a user name and password and trained users are issued these IDs that are stored within the stack. Users can book up to one week in advance normally but I have the option of overriding that. When the stack reaches a certain size it is archived and the current data is copied to a new stack. The system is not really secure but works well for us. ■

U.S. Readers:

If you have not previously completed the brief questionnaire contained on our reader's response card, and trusting that you wish to continue to receive a no cost copy of this newsletter, we would appreciate you doing so. If you are not certain whether you have previously furnished this information, kindly do so (again?). As you will note, postage is paid on the response card.

And, while you are at it, please check to see that the address we are using for you is as complete and accurate as possible. Remember, however, that our USPS software assigns the 4-digit zipcode extension based upon your street address and we really do not have a choice.

Many thanks for your assistance!

Don Grimes, Editor

Front Page Images
Intentional Defects in Interlayer Dielectric Materials

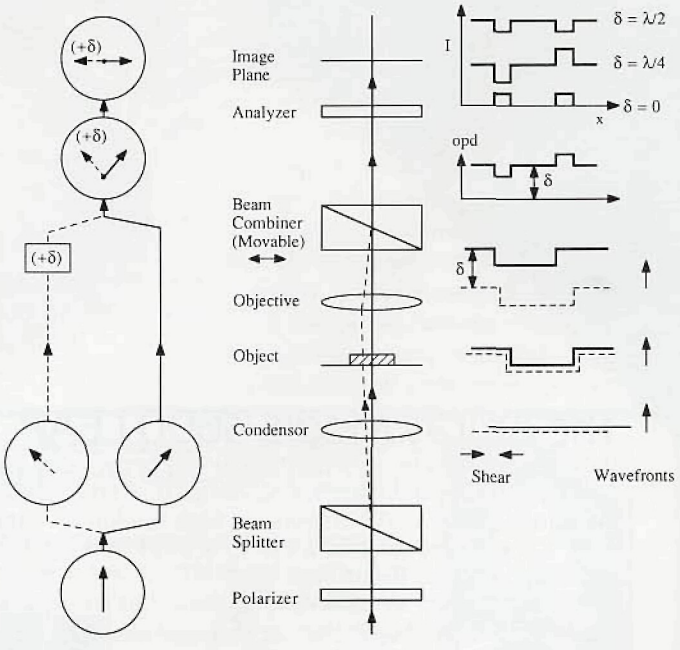
Interference Contrast Microscopy

The optical inspection transparent thin films, of the type used in semiconductor integrated circuits (IC), poses unique challenges to the microscopist. First, the geometric features on the surface are very small. Second, contrast is low since the features are fabricated from transparent films, which are often adjacent to metal surfaces. Interference contrast microscopy is a technique which takes advantage of these characteristics of the surface to produce highly informative images useful for defect inspection and process evaluation.

The basic technique was developed by Nomarski[1] and is often referred to as Nomarski Interference Contrast (NIC) or Differential Interference Contrast (DIC). The technique takes advantage of optical path differences present on the surface. Plane polarized white light is split into two slightly differing length paths in such a way that the light in one path is polarized 90° relative to the other. These two beams pass through an adjustable beam combiner and illuminate the surface. The collection of optical path differences created by the surface create different interference conditions, which are adjustable via the beam combiner. Since the interference condition is wavelength dependent, when white light is used to illuminate the surface, dramatic color variations occur in the image. The colors translate to the local variations in the surface topography. Variations less than 50 A are easily detected, making NIC microscopy an easy and efficient technique for IC inspection, often providing information comparable to scanning electron microscopy.

1. G. Nomarski, French Patent No. 1059124 and 1056361

M.J. Lobadas & D.K. Deese, Dow Corning Corporation
Photographs by Diana K. Deese



The Optical System for Nomarski Interference Contrast Microscopy

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