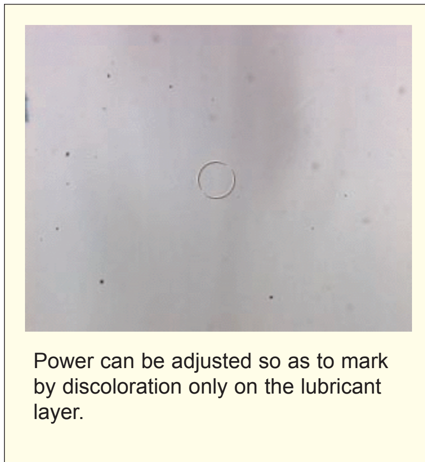
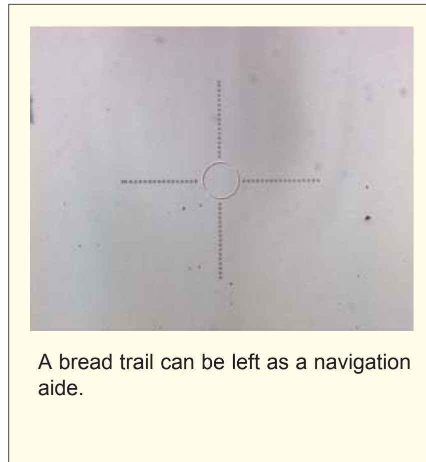
PHOTONIC INSTRUMENTS, INC.

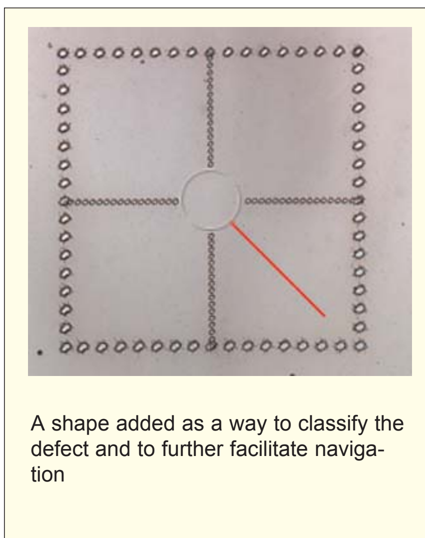
Hard Disk / Disk Media



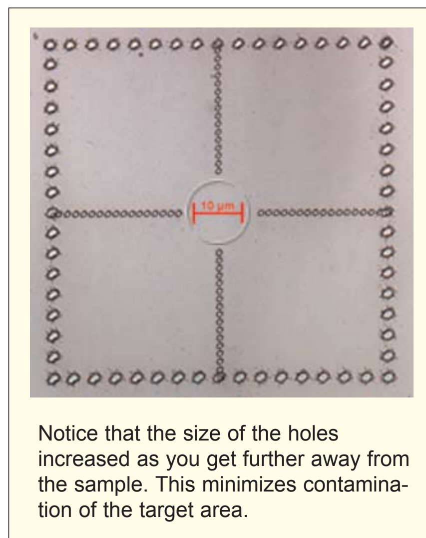
Power can be adjusted so as to mark by discoloration only on the lubricant layer.



A bread trail can be left as a navigation aide.



A shape added as a way to classify the defect and to further facilitate navigation



Notice that the size of the holes increased as you get further away from the sample. This minimizes contamination of the target area.

Size of shapes can range from a few microns to several millimeters.

Disk Media Navigation in Scanning Electron Microscopy

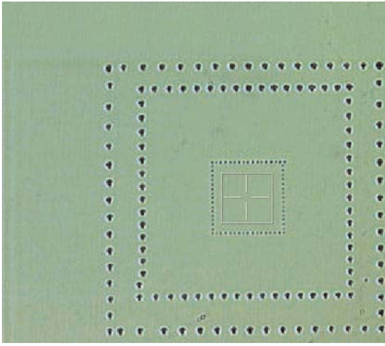
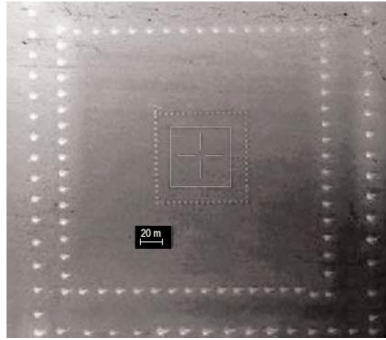
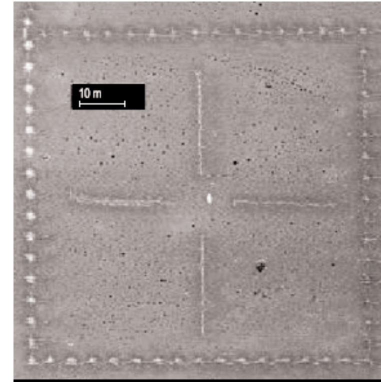


Image captured using 10X and 20X objectives on Optical Microscope

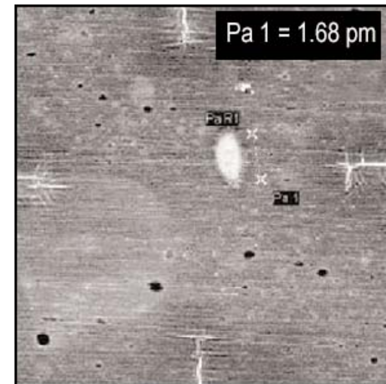


SEM image



SEM image

Disk media and other very homogenous, flat surfaces pose a serious difficulty to the operators of electron beam imaging devices. The Micropoint laser system attached to an optical microscope allows for submicron non-contact marking of features, eliminating time consuming methods in locating defects when the media is transferred to another imaging device. Additionally, the galvanometer beam steering systems allows the Micropoint to make consistent patterns (square, circle, triangle, reticle marks and single points), allowing the users to identify or index marked features according to the pattern type. Even long “bread-trail” like lines, leading to the edge of the media can be made by moving the microscope sample stage.



SEM image

In the example shown, working clockwise from the top left, we have an optical image captured with a Zeiss Axiotech microscope using a 10x/0.2 objective, in brightfield mode. The laser marks were made with two different objectives, clearly identified by their size. As the marks were made, from outside pattern to center, the power of the laser was reduced. The final single point in the center (measured at 1.68um in the last image) is simply a discoloration of the media, causing no damage to the media surface. The other marks were clearly of a higher energy which the SEM images show to have pitting and stressing of the media surface. When the HDD media was transferred from the optical microscope to the SEM, only 30 seconds were required to find the laser marks on the perfectly homogenous surface, thus proving the highly efficient method of eliminating the time consuming methods typically used for SEM/FIB evaluations. The accurate diffraction limited marks are made in real time and remove typical inconsistencies of manual, scratch type and ink-based marking methods .

Our thanks to the LEO electron microscope company for their assistance in providing the SEM images.

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