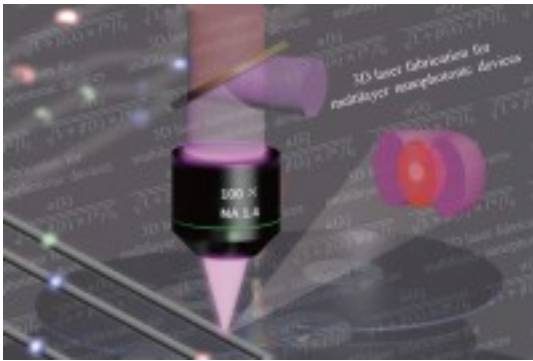


Twisting Optical Science for Bigger Optical Discs

Written by Marco Attard
27 June 2013

Researchers at the Swinburne University of Technology overcome a law of optical science to develop technology boosting DVD storage capacity-- a change in writing lasers boosts DVD storage capacity from 4.7GB to up to 1 petabyte.



The technology enables "three-dimensional optical beam lithography at nine nanometres" and acts as a turnaround to Abbe's Limit, the law discovered in 1873 by Ernst Abbe.

Abbe's Limit states light beam focused by a lens cannot produce a focal spot smaller than half of the wavelength (or 500nm) for visible light. It allowed for the development of modern optical microscopy, but set a barrier for scientists working in the nanometer scale.

"The new technique produces a focal spot that is 1/10000 of a human hair, enabling more data to be written to disc," Swinburne Centre for Micro-Photonics director Professor Min Gu says.

To "twist" the law the scientists use two differently-shaped lasers to write data on disc instead of one. One is a regular circular laser, the other is doughnut shaped (or toroidal). When the beams overlap the doughnut-shaped laser blocks part of the regular one, resulting in a circle of light much smaller than the beam producing it-- a "nano-beam" with a focal spot just 9nm in diameter compared to the 800nm original.

Such a nano-beam can create three-dimensional dot images to multiply the number of dots (and

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therefore the storage) on a disc even further. It also allows the creation of freestanding nanowires for the construction of 3D nano-scale structures, the researchers continue.

The team does not give a time frame for the commercial availability of such technology, but the use of conventional equipment (as in regular lasers) should make it public soon enough. After all, one cannot have too much storage, right?

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