AS WE GO TO PRESS

Superlens achieves 60-nm resolution

At the University of California, Berkeley, scientists have created what they call a superlens that can achieve a resolution of 60 nm, or 1/6 the illumination wavelength — much higher than the approximately 400-nm resolution of optical microscopes.

Instead of imaging the propagating light from an object, this technique images the evanescent field coming from the object. This type of imaging isn't easy because the fields decay exponentially and are lost before reaching the imaging plane.

To image the fields, the researchers used a concept first proposed in the 1970s: Enhance evanescent waves using an intimate-contact mask. Others have tried to accomplish this, but it requires a material with a negative index of refraction. The California researchers also found that the thickness of the material also is extremely important.

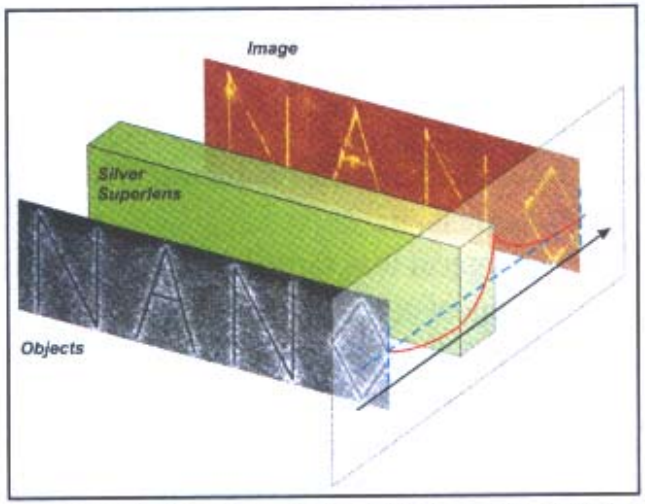

Image by Cheng Sun, University of California, Berkeley.

Led by Nicholas Fang, they used a 35-nm-thick silver film as a lens. The silver film can resonate with a band of evanescent fields of the near-field object and transfer them to the farther side with enhanced amplitude. The object was separated from the silver by a 40-nm-thick layer of PMMA. A photoresist on the other side of the silver superlens recorded an image when the opposite side of the sample received 365-nm illumination.

In the April 22 issue of *Science*, the researchers demonstrate the technique by recording an image of an array of nanowires and the word "NANO" onto an organic polymer. They say that one future application of the technique could be in medical imaging. □