

Week 34
August 2009

NILT Nano Newsletter

Dear Colleagues,

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Welcome to this week's nano newsletter. Mikhail Noginov, professor of physics in the Center for Materials Research at Norfolk State University in Norfolk, has together with Ulrich Wiesner of Cornell University and Vladimir Shalaev and Evgenii Narimanov of Purdue University developed the smallest laser ever - called a *spaser*. The spaser is based on surface plasmons and consists of a single nanoparticle 44 nanometers in diameter. In a conventional laser, photons bounce between two mirrors through a gain medium that amplifies the light so theoretically, the smallest conventional laser one can make is half the wavelength of the light it emits - 200 nm for light in the visible range. The light in a spaser bounces around on the surface of a gold sphere in the nanoparticle's core in the form of plasmons. To prevent the energy from dissipating rapidly from the gold surface the gold sphere is covered with a layer of silica embedded with dye so the layer also acts as the gain medium. Light from the spaser can remain confined as plasmons or it can be made to leave the particle surface as photons in the visible-light range. The spaser is optically pumped with a pulsed laser and the researchers believe that the spaser can be made as small as one nanometer. The results have been published in Nature. Read this and the 7 other very interesting news below.

Editor, CTO, NIL Technology
Brian Bilenberg



[The Smallest Laser Ever Made](#)

Surface-plasmon lasers could enable a new generation of computers based on nanophotonics.

[\[Technologyreview.com\]](#)



[Supercritical Fluids Used to Create 3 Nanometer Wiring](#)

Using supercritical fluids, researchers in the UK deposited 3nm copper wiring by infiltrating the fluid into porous SiO₂. While commercial deployment depends on next-generation patterning methods, the process is highly extensible and scalable, making it a prime candidate for future device fabrication.

[\[Arstechnica.com/\]](#)

[Nuclear Fusion Research Key for a New Class of Nanolithography](#)

Researchers are adapting the same methods used in fusion-energy research to create extremely thin plasma beams for a new class of nanolithography required to make future computer chips.



[Sciencedaily.com]

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Molecules Wrestle for Supremacy in Creation of Superstructures

Research at the University of Liverpool has found how mirror-image molecules gain control over each other and dictate the physical state of superstructures.

[Nanowerk.com]



Camera Flash Turns an Insulating Material Into a Conductor

An insulator can now be transformed to conduct electricity by an ordinary camera flash.

[Physorg.com]



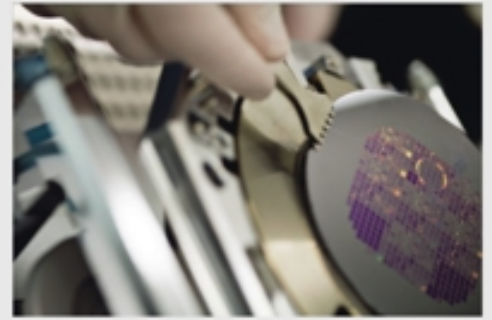
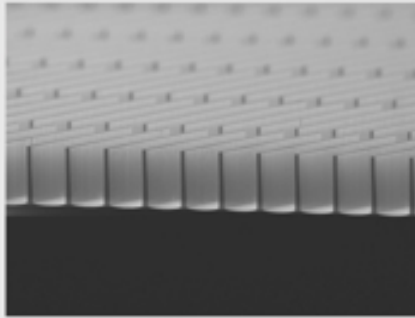
Nanowire Advance for Lithium Batteries

Electrodes made of carbon-silicon nanowires could boost the life and performance of lithium-ion batteries.

[Technologyreview.com]

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Nanomotors Detect Trace Silver

Researchers in the US and Germany have found that the speed of synthetic 'nanomotors' responds to nearby concentrations of silver. The discovery suggests that nanomotors could be used to detect trace levels of silver and other toxic substances in water supplies - a practice that has previously required bulky instrumentation.

[\[RSC.org\]](#)



DNA Shapes Up for Nanoelectronic Devices

Researchers have taken a step towards the next generation of high-speed computer chips by controlling how triangle-shaped pieces of DNA mount themselves on a surface. The 'DNA origami' act as tiny fastening posts to which nanoscale electrical components can easily be attached, and have great potential in futuristic circuitry.

[\[RSC.org\]](#)

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