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Spontaneous improvements on the horizon



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Belle Dumé | May 26

physicsWeb - Physicists in Japan have shown that they can manipulate the spontaneous emission of light in photonic crystals. The results could lead to improvements in the performance of light-emitting diodes, lasers and solar cells. Whereas the stimulated emission of light is the basis of laser operation, spontaneous emission tends to waste energy in optoelectronic devices. However, Susumu Noda and colleagues at Kyoto University have now found a way to both reduce spontaneous emission and extract it as useful light

Also see Science, and more, after the jump. If you don't have a subscription, please email me. For the investor types, this is certainly an emerging sector not to be neglected. It will be one of those insignificant but solid revolution of the type of the light bulb, the digital display or quartz watch.

May 27 | E. Fred Schubert and Jong Kyu Kim

Science - More than a century after the introduction of incandescent lighting and half a century after the introduction of fluorescent lighting, solid-state light sources are revolutionizing an increasing number of applications. Whereas the efficiency of conventional incandescent and fluorescent lights is limited by fundamental factors that cannot be overcome, the efficiency of solid-state sources is limited only by human creativity and imagination. The high efficiency of solid-state sources already provides energy savings and environmental benefits in a number of applications. However, solid-state sources also offer controllability of their spectral power distribution, spatial distribution, color temperature, temporal modulation, and polarization properties. Such "smart" light sources can adjust to specific environments and requirements, a property that could result in tremendous benefits in lighting, automobiles, transportation, communication, imaging, agriculture, and medicine.

Also see 2000 feature in Physicsworld And this month's Policy Forum at Science , very interesting:

The Specter of Fuel-Based Lighting

May 27 | van Mills

Science - Thomas Edison's seemingly forward-looking statement that "we will make electricity so cheap that only the rich will burn candles" [HN1] (1) was true for the industrialized world, but it did not anticipate the plight of 1.6 billion people (2)--more than the world's population in Edison's time--who more than a century later still lack access to electricity (see figure, this page). While electricity was becoming available in the wealthier countries, leaders of the oil industry (3, 4) promoted lighting-oil products in China and elsewhere. The legacy of costly and low-grade lighting for the world's poor remains. For those without access to electricity,

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lighting is derived from a diversity of sources, including kerosene, diesel, propane, biomass, candles, and yak butter. Many of the 35 million people living in camps for refugees and internally displaced people have no light at all.

Throughout the developing world, 14% of urban households and 49% of rural households were without electricity as of the year 2000 (2). [HN2] In extreme cases, e.g., Ethiopia and Uganda, only ~1% of rural households are electrified (5). An unknown additional number of people have intermittent access to electricity in their homes or lack it altogether in their workplaces, markets, schools, or clinics (6). The number and proportion of people lacking electricity is growing in sub-Saharan Africa and parts of Latin America and the Caribbean, the Middle East, and South Asia (7). Population growth, stalling rates of electrification, and declining household sizes (8) [HN3] exacerbate the problem. The number of people without access to electricity globally is projected to decline at only 0.4%/year over the next 3 decades (2).

Mathieu May 30, 2005 - 11:54pm

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(categories: News | Science)

I have a question, Can people access the last

article, The Specter of Fuel-Based Lighting

Else I'll post it in full as I think it is worth it .

Mathieu May 31, 2005 - 8:53am

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suspicious

It will be great for more people to have better lighting, I personally can't imagine living by candlelight after dark. But I am suspicious of this article.

The Science article (Fig 4) shows that the new solar LED is very cheap compared to EVERYTHING, it is almost 10,000 times cheaper than using a flashlight. Very impressive. But the same table also shows that the most dramatic factor is the "focusing lens" which gives a factor of 90 improvement, not the LED itself.

The LED itself is 22 times more expensive than the simple fluorescent bulb we all have in our houses.

So my conclusion from this table is that Bill Gates (or whoever) would be wise to forget the solar LED and invest in rural electrification. Of course that is the opposite conclusion of the Science article.

marcf May 31, 2005 - 11:36am

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More hype around solid-state lighting

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The solid-state lighting revolution

Feature: July 2005

More efficient and versatile than traditional incandescent bulbs, solid-state lights based on LEDs are on the verge of transforming electric lighting forever

FOR THE last 125 years we have been able to shine light whenever and wherever we need it by simply flipping a switch. This revolution started when Thomas Edison developed the first commercial electric light bulb in 1879, and very little has changed since. The reason for this is partly because new technologies have all followed the same old paradigm: fragile, gas-filled glass envelopes with metal end-caps that produce an orb of steady, white light. However, this may soon change with the dawn of the second lighting revolution: solid-state lighting.

Unlike existing incandescent sources, which provide light that is static in space and time, solid-state sources can produce light that changes in colour, intensity and distribution, based on lighting needs and time. This could allow us, for example, to illuminate and decorate our living spaces with glowing walls and ceilings, avoiding the need for intrusive light fixtures. Furthermore, solid-state lighting consumes 50% less energy than traditional sources, while also reducing environmental waste and pollution.

To read the full version of this article - and the rest of the July issue of Physics World - please subscribe to our print edition. Mathieu July 6, 2005 - 10:08am

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This is becoming an excellent thread eom.

Graham72 July 6, 2005 - 6:09pm

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heres a pdf link to article

http://eetd.lbl.gov/emills/PUBS/PDF/FBL_1-pager.pdf

candy May 31, 2005 - 9:01am

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