

PHYSICS

PSU researchers harness light for data transmission

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Harnessing the power of light? This is what scientists and engineers at Penn State are trying to do.

They are experimenting with the transmission of data over a wireless network, with hopes of improving speed and allowing Wi-Fi to be more accessible all over the world.

Penn State

is at the forefront of this technology that could make future communications networks use the light spectrum.

Scientists have been trying to tap into the light spectrum for communications purposes because the speed of light is much faster than the speed of sound. If the spectrum of light can be harnessed for the use of communications, the possibilities are endless.

Right now, most communications networks run on the radio frequency spectrum which is extremely congested because of its use by paramedics, hospitals, firefighters, and police.

The switch of broadcast antenna TV from analog signal to digital signal lessened the congestion of the RF spectrum. This freed up the RF spectrum for more emergency personnel.

However, the RF spectrum is still very congested and slows down the transmission rate of data, which is why scientists and engineers have been trying to harness the light spectrum for use in communications since the late 1970s.

There was a major breakthrough in early February 2010 when Penn State graduate student Jarir Fadlullah and Mohsen Kavehrad, a professor of electrical engineering and

the director of the university's Center for Information and Communications Technology Research, constructed a device that bounced infrared light off walls and back to a transceiver which detected that light.

They calculated data transmission rates of one gigabit per second - the fastest Wi-Fi transmission of data in the world.

With the construction of this device, Wi-Fi networks around the world would be able to transmit data at speeds which, until recently, no one thought possible.

Fadlullah and Kavehrad both say that their system can support transmission speeds far beyond one gigabyte per second.

However, researchers like Fadlullah and Kavehrad still have a long way to go in perfecting devices that will transmit data using light and getting them ready for commercial use.

The possibilities are endless; the light spectrum could transform our whole society from, say, video game consoles to how hospitals and nations communicate, to future wireless networks.

Top Science News:

New world record for breath-holding set

Pete Colat, a Swiss freediver, held his breath in a tank of water for 19 minutes and 21 seconds.

He broke the previous record by 21 seconds.

How can someone hold their breath for so long when most of us can only do so for a few mere minutes?

"It is, as a matter of fact, possible -- with certain tricks," said Claes Lundgren, a physiologist at the University of Buffalo School of Medicine in New York.

To fight the instinct to breathe, competitive breath-holders hyperventilate for up to 10 minutes in a tank of 100 percent oxygen before entering a tank of water.

Iran: the fastest growing nation in science

Iran's scientific output is at a rate 11 times faster than the world's average, the highest in the world.

According to a survey of a number of publications in the Web of Science database, growth in the Middle East is nearly four times faster than the world average.

The world put out 450,000 scientific papers in 1980. In 2009, 1.5 million were published, with Asia surpassing North America.

Today in Science

Today will mark the 537th anniversary of the birth of Polish astronomer Nicolaus Copernicus.

Copernicus proposed that the planets' motions were fixed around the Sun. He also proposed that the Earth rotated on its axis once daily, and orbited the Sun annually.

Fellow astronomers Galileo Galilei and Filippo (Giordano) Bruno, who came after Copernicus, embraced his theories wholeheartedly. Unfortunately for them, they suffered at the hands of church inquisitors, which Copernicus never had to face. Bruno was burned at the stake, while Galileo was held under house arrest for the last nine years of his life.

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SCIENCE IN THE COMMUNITY

Behrend to host PJAS science competition

ELIZABETH MASTELLER
science reporter

Penn State Erie will be hosting the Pennsylvania Junior Academy of Science competition this weekend to display their various projects in the Junker Center among other places on campus.

PJAS, this year held at Behrend on Feb. 20, is a "statewide organization of junior and senior high school students designed to stimulate and promote interest in science among its members through the development of research projects and investigations," according to their website.

The organization opens up the ability for students to explore the

world of science and use the scientific method to learn about research.

Students usually begin by hearing about PJAS in their schools; it starts out as a school science project.

Students do research and decide what project they would like to do, with their options open.

Once they decide on an idea, they must gather information on their topic and figure out what re-

sources they will need.

After this, the student must form a hypothesis.

Once all of this is done, the student must submit it and hope to get approved. Then they must begin to carry out the experiment, possibly repeating it numerous times to collect data.

After they collect all their data, they need to analyze it.

Once analysis is done they need to interpret the data

and make conclusions that relate to their hypothesis, either agreeing with it or refuting it.

From this they must make a final statement, again regarding their hypothesis, whether they found it to be verified or disproven.

After this whole process the student must prepare to share their data. They can do this through a report, graphs, posters, and anything else they can think of. It's good to try to keep it original and interesting.

The students that will be here at Behrend have already won their school competitions and will be competing on the regional level on Saturday.

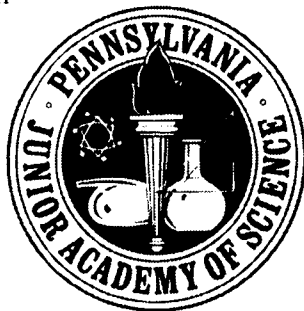


photo: pjas.net
What: High school science competition
Where: Penn State Behrend
When: Saturday, Feb. 20, 8am-4pm
Why should I go: Lots of interesting science experiments. Learn something!

SHARE YOUR DISCOVERIES

Interviews are available for science reporters with the Behrend Beacon.

Every year for a decade, employers have rated communication skills as their biggest priority in new recruits.

What are YOU doing to set yourself apart?

Student organizations:

Want to promote an upcoming event?

A 10% discount is given to all Behrend student organizations. And your first ad this academic year is FREE.

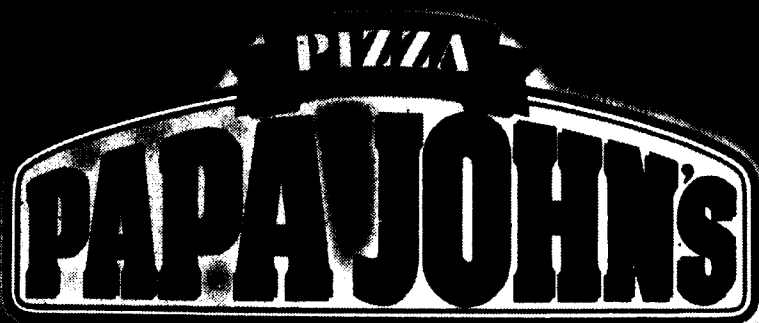
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