

## LI-FI

R.V. Grudij – Sumy State University, group SU-02

V. S. Kurochkina – E L Adviser

Visible light communication (VLC) uses rapid pulses of light to transmit information wirelessly. Now it may be ready to compete with conventional Wi-Fi (Wireless Fidelity).

At the heart of this technology is a new generation of high-brightness light-emitting diodes. Very simply, if the LED is on, you transmit a digital 1, if it's off you transmit a 0. They can be switched on and off very quickly, which gives nice opportunities for transmitting data. It is possible to encode data in the light by varying the rate at which the LEDs flicker on and off to give different strings of 1s and 0s. The LED intensity is modulated so rapidly that human eyes cannot notice, so the output appears constant.

Li-Fi, as it has been dubbed, has already achieved blisteringly high speeds in the lab. Researchers at the Heinrich Hertz Institute in Berlin, Germany, have reached [data rates of over 500 megabytes per second using a standard white-light LED](#).

There are around 14 billion light bulbs worldwide, they just need to be replaced with LED ones that transmit data. VLC could be used safely in aircraft, integrated into medical devices and hospitals where Wi-Fi is banned, or even underwater, where Wi-Fi doesn't work at all.

Once established, VLC could solve some major communication problems. In 2009, the US Federal Communications Commission warned of a looming spectrum crisis: because our mobile devices are so data-hungry we will soon run out of radio-frequency bandwidth. Li-Fi could free up bandwidth, especially as much of the infrastructure is already in place.