Light bulbs offer huge potential for safe, cheap transmission of wireless data, researcher says

Professor Harald Haas, chair of mobile communications for the University of Edinburgh in Scotland, is out to prove that an ordinary desk lamp, retrofitted with a simple LED bulb, will transmit electronic data signals faster and more efficiently than radio wave technology.

Using his research on orthogonal frequency division multiplexing (OFDM) and spatial modulation, Haas argues that the visible light spectrum not only is safer to use for data streams, but provides 10,000 times more space compared to radio waves. His data illumination concept comes at a time when there are 14 billion light bulbs currently in use around the world and wireless communications are nearly as commonplace a utility as electricity or water.

"It should be so cheap that it's everywhere," Haas says. "Using the visible light spectrum, which comes for free, you can piggy-back existing wireless services on the back of lighting equipment."

In a live demonstration for TED Conferences, Haas showcases a lamp fitted with a $3 LED bulb, which illuminates a receiver for electrical signals and converts those signals back to a data stream. When the light is on, it powers the high-definition video on a projector. Haas blocks light from the receiving area with his hand and the video halts. The illumination receiver focuses on subtle changes, so the light must be on for the process to work, but dimming is an option, he said.

Along with solving the issue of capacity, the data illumination concept would not require the massive energy consumption that is needed to cool base stations, nor would it penetrate walls, providing better wireless security. It can be shut off at any time and utilized at very high speeds. Visible light can translate thousands of parallel data streams per second, compared to remote controls with only one data stream.

Haas believes the possibility of fitting a small microchip to every illumination device could make for a "cleaner, greener, and even a brighter future."

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