Addressing …
• congested Wi-Fi traffic
• the lack of signals in areas with no Wi-Fi reception or in Wi-Fi restricted areas such as hospitals and military installations
• the relatively slower wireless communications with current LED technology

Key Features
• Fast-switching LED with a high bandwidth of 200MHz without the need for nano-patterning techniques
• More compact devices - dual purpose LED can be used as an emitter and detector, which reduces the physical footprint of Li-Fi dongle
• Faster white light communications made possible with QD colour converters which are 9x faster than currently used rare-earth doped phosphors
• Large scale, low cost, solution-processed QD LEDs and solar cells for communications

Solution
• IMRE developed a technology using visible LEDs for wireless, bi-directional communications.
• Plasmonics is used to improve the switching speed of LED, which currently limits the rate of data transmission.
• Quantum Dots (QD) are used in place of rare-earth doped phosphors for fast white light communications.

Potential Applications
• Securing communications in hospitals and military installations
• Relieving congested Wi-Fi traffic in office, IoT, aerospace environment

Collaboration Opportunities
• Licensing and adoption of technology
• Exploration of new areas of Li-Fi applications
• Co-development of LED technologies and Li-Fi products

About the Technology
Please see next page.

Photonics: LED Communications

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A schematic diagram of Li-Fi communications, where 1’s and 0’s data are converted to voltage pulses used to drive the LED light. This signal is received with a Li-Fi dongle, which includes a detector and electronic circuit to convert the optical signal back to electrical signal, demonstrating a proof-of-concept. We have also developed a fast-switching LED, which can be used to replace existing LED sources for faster switching speed and higher data transmission. The QD colour converter is much faster than rare-earth doped phosphors for white light communications. We can use the IMRE developed LED detector for both emission and detection of signals in the Li-Fi dongle.

References: