Photonics-assisted wireless link based on mm-wave reconfigurable antennas

The authors report a novel concept for photonics-assisted and broadband optical-wireless indoor networks based on optically-controlled reconfigurable antenna arrays (OCRAAs) and photonic down conversion (PDC) techniques, operating in the 28 and 38 GHz frequency bands. The antenna bandwidth is optically reconfigured by using photoconductive switches. In this way, the optical backhaul can either be used for high data rate transmission and remotely controlling the antenna operation. Experimental results on 40 Mbaud with complex modulation formats up to 64-QAM wireless transmission supported by PDC are successfully reported under 78 dB link budget requirement. Two OCRAAs have been simultaneously tested in an indoor environment at 1.25 Gb/s wireless data signal transmission. The proposed antenna design significantly increases the degrees of freedom, opening new possibilities in the development of antennas for access networks in the mm-wave frequency range.