

## Hybrid Free Space optical (FSO)/Radio Frequency (RF) Communication for Future Wireless Networks



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**Abstract:** Free space optics (FSO) technology offers large bandwidth in the unlicensed spectrum that can support seamless high-speed broadband connectivity, which is a significant requirement for data intensive applications. However, the FSO link is highly susceptible to atmospheric effects. The major challenge for FSO link is the attenuation due to fog. Hence, there is an important need to increase the reliability of these links. One efficient solution is to use a millimetre wave (MMW) RF link together with the FSO link so as to serve as a back-up in the case of FSO link outage. It is well known that FSO and MMW RF transmissions are restricted to short distances. Therefore, in a FSO/RF-based wireless backhaul network, a distributed architecture is presented, where the backhaul traffic is relayed from the small cell base station to adjacent relay station and then finally forwarded to the macro-cell base station. The misalignment between the FSO transmitter and receiver apertures causes pointing errors that degrades the system performance to a great extent. In a MIMO system, it is highly unlikely that multiple FSO links undergo same severity level of pointing errors. Therefore, aperture selection is employed to counteract the effect of pointing errors. Further, spatial modulation (SM) is also employed where antenna indexes together with signal modulation is used to transmit the data.

**Bio:** SHUBHA SHARMA has recently finished her Ph.D. from School of Computer Science and Engineering at Nanyang Technological University (NTU) Singapore. Prior to this, she has worked as a Research Associate at NTU Singapore. Earlier, she received her M.Tech. Degree in Electronics and Communication Engineering from IIIT Delhi, India. Her current research interest focuses on free space optics/radio frequency communication, Next-generation terrestrial communication and satellite communications, Cooperative communications, MIMO systems.

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