Advancements in free space optical communication

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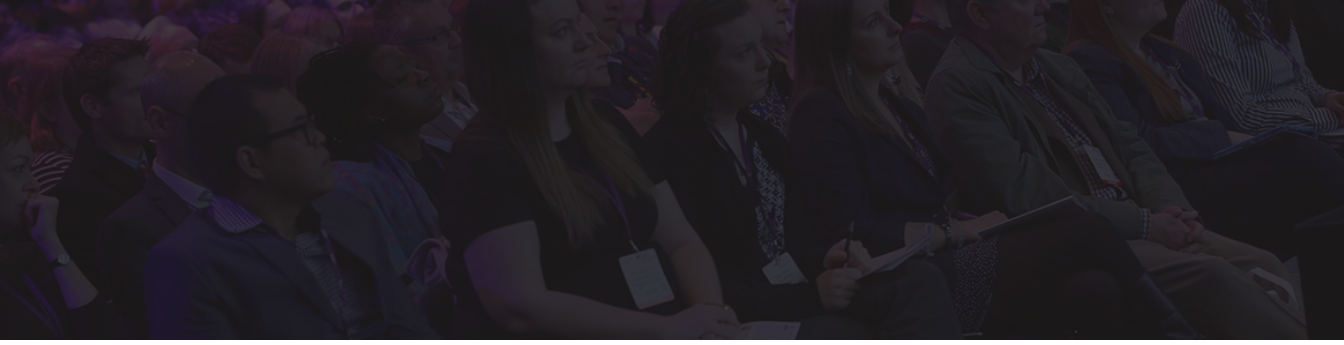
The technology of optical communication has gained importance due to high bandwidth and data rate requirements. The thrust areas of research under Optical Communications include Optical Wireless links, WDM, wavelength interleaving, newer modulation formats, etc. In recent, different scenarios of optical communication techniques like WDM, RoFSO, and bidirectional link and under water optical transmission are benefitted to utilizing optical bandwidth in the field of Free Space Optical communication (FSO). Free Space Optical (FSO) communication is capable of providing cable free communication at very high data rates up to Gbps. It is a growing area of research these days due to its low power, bandwidth scalability, unregulated spectrum, mass requirement, rapid speed of deployment and cost-effectiveness. Recent growth of FSO is evidenced by vast improvement in communication technology, resulting in investigations of many exciting simulative and experimental implementations. However, the system is influenced by unpredictable atmospheric and weather conditions, therefore it degrades the optical link performance. Current works are focusing on research trend and recent advancements in FSO communication. Solutions to make FSO an efficient technology, architecture for future mobile communication system are portrayed. The reliability of the FSO link can be improved by constructing atmospheric chamber as prototype to study free space channel and its characterization can be done under a controlled environment without the need for longer waiting times as would be in the case of outdoor FSO links. To mimic the outdoor environmental conditions, an indoor chamber equipped with fans and heating coil is made up, which gives manual control of the temperature and wind velocity within the chamber. We have tried to characterize the combined effect of the wind and the temperature induced scintillation on the FSO system. The effect of perpendicular wind flow on a rain interrupted FSO link is also experimentally investigated using a laboratory tested. Performance analysis of various modulation formats in terms of their communication metrics has been evaluated. In brief, the experimental analysis of Free Space Optical Link under controlled atmospheric turbulence created within an indoor chamber, which replicates the outdoor environment. The free space needs to be characterized and optimized to maintain a particular strength of turbulence. The performance of the link is evaluated by calculating the parameters like BER, SNR, min. received power etc. To increase the model's credibility to an acceptable level, simulation work is done for verifying the model correctly and validating an accurate representation of the real system.

Biography: Shilpi Gupta is an Assistant Professor of Electronics Engineering Department at Sardar Vallabhbhai National Institute of Technology. She received her Ph.D in Wireless Communication SVNIT, Surat in 2015. She received her M. Tech. degree from Kurukshetra University in 2007. She has published papers in reputed International journals. Her teaching and current research activities are focused on Free Space Optics, Optical biosensors using LPFG,



FBG, Signal Processing, OFDM Technology, MIMO Technology, MIMO Radar Technology, Massive MIMO and 5G Technology. She works also as reviewer in an International Journal and had been as reviewer and program committees in International Conferences. She has supervised many undergraduate and postgraduate students to graduation. She is member of IEEE, IETE.

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