

Optical MEMS and Visible Light Communication

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Abstract:

Wireless networking is currently dominated by radio frequency (RF) techniques. However, the scarcity of frequency spectrum calls for advantageous techniques emphasizing resource-saving. The soon-to-be ubiquitous LED-based lighting motivated by significant energy efficiency provides an opportunistic deployment of widespread free-space optical communications. Visible light communication (VLC) explores the reusable unregulated part of the spectrum and is potential to provide indoor communication link and meantime satisfy the requirement of illumination. Though many technical problems regarding VLC need gradually be addressed, the narrow bandwidth of LED chips is the bottleneck hindering its development. Our works on Optical MEMS focus on the fabrication of nitride resonant optical devices, pitch-variable gratings and MEMS-tunable LED source, which are promising to provide solutions and promote the development of VLC.

In this talk, I will review some of the research accomplishments we made over the last few years on this emerging and exciting field, with focuses on some key technologies referring to ubiquitous optical communication transmission and introduction of the design, fabrication and analysis of MEMS on nitride/silicon substrates. Research of VLC technology under specific scenarios will be discussed; latest VLC demonstration system and its integration with existing communication networks will be presented.