Researchers from the University of Melbourne have developed a nanostructured thin film that selectively filters light based on its elliptical polarisation state. By placing the nanostructured thin film on the receiving end of the optical fiber communication system (as shown in Fig 1), it would enable an additional domain for transmitting data through the existing system, thereby significantly increasing the bandwidth of the system.

The development of the nanostructured thin film has been the result of a deep understanding of the behaviour of light at the nanoscale level. Key benefits of the invention include:

• Enables the filtering of light based on its elliptically polarised state
• Easy to manufacture through lithography and scalable for commercial purposes
• Significantly increases the bandwidth of optical communication systems by as much as 100%
• Easy integration by applying thin film to photodiodes used within optical communication systems

Optical fiber systems are being used as core networks for telecommunications, and they are replacing traditional copper networks. The amount of information that can be relayed across telecommunication systems, its bandwidth, is a crucial element of the system as there is an ever increasing demand for bandwidth. Methods to improve bandwidth generally involve improving the hardware infrastructure of optical fiber systems, but the costs and scale of work associated with such upgrades are generally prohibitive.

There are currently no commercially available solutions that specifically enable the filtering of light based on its elliptically polarised state. A system to split linear polarisation states with dichroic sheets could be implemented, but the complexity of the system would require significant investment in infrastructure to integrate this capability within existing optical fiber systems.

The nanostructured thin film has been shown to effectively filter light based on its elliptically polarised state. The technology is the subject of an Australian provisional patent application (AU2015904848), and further research and development is being undertaken to refine the technology and to explore new applications.

This invention has been developed in collaboration with Nanyang Technological University, Singapore. The University of Melbourne is leading its commercialisation and is seeking partners to accelerate the adoption of this technology through co-development, licensing or direct investment.

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