The use of light’s orbital angular momentum in communications and beyond

Thursday, May 28, 2015
1:00 PM
F.W. Olin Hall Room 205
2190 E. Iliff Avenue

Presented by

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In this seminar I will give a technical overview of the physical understanding of Orbital Angular Momentum and discuss its implementation in the fields of communications, imaging and sensing. I will discuss the tools developed for the purpose of using OAM for the multiplexing of independent data streams, focusing on the development of efficient Multiplexers, Obstruction tolerant free-space links, and use of MIMO signal processing for OAM communication in a few modes of optical fibre. Beyond these developments in communications, I will discuss my work in the detection of spinning objects through the use of light's orbital angular momentum. The linear Doppler shift is widely used to infer the velocity of approaching objects, but this shift does not detect rotation. By analyzing the orbital angular momentum of the light scattered from a spinning object, we observed a frequency shift proportional to product of the rotation frequency of the object and the orbital angular momentum of the light.

**Bio:** Martin completed his Ph.D. at the University of Glasgow under supervision of Prof. Miles J. Padgett. After his Ph.D. he was awarded an EPRSC Doctoral Prize Fellowship to support his post-doctoral research, and in 2013 he was Awarded the Scopus Young Research Award UK in the Physical Sciences. Martin is currently the holder of Royal Academy of Engineering Research Fellowship and is based at University of Glasgow.