

IEEE Photonics Society, NSW Joint Chapter

(with Circuits and Systems, Solid State Circuits, and Electron Devices)

IEEE Distinguished Lecturer: Siddharth Ramachandran



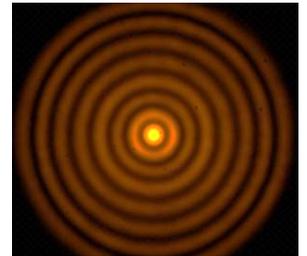
Title: Nonlinear Optics with Bessel Beams in Fibers
(can fibers replace all (most) lasers?)

Place: Freehills, Level 34, ANZ Tower 161 Castlereagh Street, Sydney.

Time/Date: 5:30 for 6:30 - 7:30 pm, Wednesday 25th June, 2014.

Note: the event shall be preceded by social drinks, 5:30- 6:30pm

Abstract: Bessel beams have generated widespread interest over the last two decades because of intriguing properties such as their diffraction-resistant nature and the ability to navigate (self-heal) past opaque obstructions. In fibers, they exist as higher order modal solutions of the waveguide. While the fact that such beams theoretically exist in fibers is well-known from any waveguides textbook, only recently was it realised that, over lengths as long as 10-100 meters, beam stability in a fiber actually increases with mode order, for the sub-class of azimuthally symmetric fiber modes (i.e. for modes whose field is described by the J_0 Bessel function).



This counter-intuitive finding has significant implications for mode area, and hence power scaling with optical fibers. More generally, and perhaps more interestingly, this results in the fiber as a nonlinear medium with dramatically enhanced degrees of freedom for phase matching. This talk will describe the physics of Bessel beam generation and propagation in fibers, and their implications for a novel degree of freedom in nonlinear topics, which lead to applications in fields as disparate as quantum-optics, deep-tissue imaging and high-power lasers.

Biography: Dr Siddharth Ramachandran obtained his Ph.D. in Electrical Engineering from the University of Illinois, Urbana-Champaign, in 1998. Thereafter, he joined Bell Laboratories as a Member of Technical Staff and subsequently continued with its spin-off, OFS Laboratories. After a decade in industry, Dr. Ramachandran moved back to academics in 2010, and is now a Professor in the Department of Electrical Engineering at Boston University.

Prof. Ramachandran's research focuses on the optical physics of guided waves. He has authored over 200 refereed journal and conference publications, more than 45 invited talks, plenary lectures and tutorials, 3 book-chapters, edited one book, and has been granted 37 patents. For his contributions in the field of fiber-optics, he was named a Distinguished Member of Technical Staff at OFS Labs in 2003, a fellow of the *Optical Society of America* (OSA) in 2010, and an IEEE Distinguished Lecturer for 2013-2014. He served as a topical editor for *Optics Letters* from 2008-2011, and is currently an associate editor for the *IEEE Journal of Quantum Electronics*, in addition to serving on numerous conference and grant-review committees in the field of optics and applied physics.