IQEC/CLEO PACIFIC RIM 2011

Sydney, Australia

POST DEADLINE SESSIONS

1600-1700 Thursday 1 September 2011

Post Deadline Session 1 – Bayside Auditorium A

Chair: Martijn de Sterke, The University of Sydney, AUSTRALIA

1600-1610	Ping-Fung Ng[1], Mary Ann Go[2], Bérenger Seelweger[3], Hans-A. Bachor[1], **Vincent R. Daria[1]** *1. Research School of Physics and Engineering, The Australian National University, Australia* *2. The John Cur tin School of Medical Research, The Australian National University, Australia* *3. École Nationale Supérieure D'Ingénieurs de Caen, Caen, France* **Non-linear Transfer of Orbital Angular Momentum** The orbital angular momentum (OAM) carried by Laguerre-Gaussian beams can be transferred to move particles along its ring-shaped intensity distribution. Here, we show a unique non-linear effect where a fluorescent microbead is moved in the opposite direction as the OAM.
1610-1620	**Isabelle Staude[1]**, Christopher McGuinness[2,3], Andreas Frlich[1], Robert L. Byer[2], Eric Colby[3], Martin Wegener[1,4] *1. Institut fr Angewandte Physik and DFG-Center for Functional Nanostructures (CFN), Karlsruhe Institute of Technology (KIT), Germany* *2. Ginzton Labs, Nano Center, USA* *3. SLAC National Accelerator Laboratory, USA* *4. Institut fr Nanotechnologie, Karlsruhe Institute of Technology, Germany* **Waveguides in Three-Dimensional Photonic Bandgap Materials for Particle-Accelerator on a Chip Architectures** Following a theoretical proposal by B. M. Cowan we fabricate and optically characterize pilot samples of three-dimensional photonic crystal waveguides for laser-driven particle acceleration, which offer the potential for future 'œparticle-accelerator on a chip' architectures.
1620-1630	**Ondrej Kitzler[1]**, Aaron McKay[1], Richard Mildren[1] *1. MQ Photonics Research Centre, Macquarie University, Australia* **CW diamond laser architecture for high average power Raman beam conversion** We report a cw 1064 nm-pumped external cavity diamond Raman laser operating at the 1240 nm. The slope efficiency was 42% and maximum output power, currently limited by the available pump power, was 7.5 W.
1630-1640	**Jindan Shi[1]**, Shaif-ul Alam[1], Morten Ibsen[1] *1. Optoelectronics Research Centre, University of Southampton, UK* **High Power, Low Threshold, Raman DFB Fibre Lasers** We demonstrate highly efficient Raman gain based distributed-feedback fibre-lasers at ~1.11µm with up to 2W CW output-power with <0.01nm linewidth. The lasers are 30cm long and UV-written directly into two types of passive germanosilicate fibres.
1640-1650	**S. Stark[1]**, P. Russell[1] *1. Max Planck Institute for the Science of Light, Germany* **Extreme Supercontinuum Generation to the Deep-UV** Pumping a sharply tapered (5-30 mm taper lengths) solid-core photonic crystal fiber with 130 fs, 2 nJ pulses at 800 nm generates an efficient supercontinuum down to a record-breaking 280 nm in the deep-UV.

Post Deadline Session 2 – Bayside Room 102

Chair: Ben Eggleton, The University of Sydney, AUSTRALIA

1600-1610	**Ming Lun Tseng**[1,2] ,Cheng Hung Chu[1,2], Chia Min Chang[1,2],Wei Chih Lin[1,2], Nien-Nan Chu[3], Masud Mansuripur[4], Ai Qun Liu[5], Din Ping Tsai[1,2,3,6] *1. Graduate Institute of Applied Physics, National Taiwan University, Taiwan* *2. Department of Physics, National Taiwan University, Taiwan* *3. Instrument Technology Research Center, National Applied Research Laboratories, Taiwan* *4. College of Optical Sciences, The University of Arizona, USA* *5. School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore* *6. Research Center for Applied Sciences, Academia Sinica, Taiwan* **Femto-second laser fabrication of phase change material nanostructures for novel applications** In this paper, we will demonstrate our recent results of laser lithography of nanostructures of phase change material for novel nanophotonic application.
1610-1620	**N. Jovanovic**[1,2,3], B. Norris[4], S. Gross[1,6], P. Stewart[4], N. Charles[4], M. Ams[1,6], J. Lawrence[1,2,3], S. Lacour[5], G. Marshall[1,6], G. Robertson[4], M. Ireland[1,2,3], M. Withford[1,6], P. G. Tuthill[4], *1. MQ Photonics research centre, Dept. of Physics and Astronomy, Macquarie University, Australia* *2. Centre for Astronomy, Astrophysics and Astrophotonics, Dept. Physics and Astronomy, Macquarie University, Australia* *3. Australian Astronomical Observatory, Australia* *4. Sydney Institute for Astronomy (SIFA),School of Physics, University of Sydney, Australia* *5. Observatoire de Paris, 5 place Jules Janssen, Meudon, France* *6. Centre for Ultrahigh Bandwidth Devices for Optical Systems (CUDOS), Australia* **First Stellar Photons Through an Integrated Photonic Pupil Remapping Interferometer** Integrated photonics offer numerous advantages for developing high dynamic range stellar interferometers for exoplanetary science. We report on the results from the first successful on-telescope tests of an integrated photonic pupil remapping interferometer.
1620-1630	Jialiang Jin[1], Lei Wang[1], Tingting Yu[1], Yin Wang[1], **Jian-Jun He**[1] *1. Centre for Integrated Optoelectronics, State Key Laboratory of Modern Optical Instrumentation, Zhejiang University, China* **16x100GHz Digitally Wavelength Switchable V-Coupled-Cavity Laser with 40dB SMSR** A simple and compact wavelength switchable laser based on V-coupled cavities is presented. Single-electrode-controlled wavelength switching over 16 channels with 100GHz spacing is demonstrated for the first time with side-mode-suppression-ratio as high as 40dB.

1630-1640	**Timothy T-Y. Lam**[1], Jong H. Chow[1], Daniel A. Shaddock[1], Malcolm B. Gray[2], David E. McClelland[1] *1. Centre for Gravitational Physics, Department of Quantum science, Research of Physics and Engineering, The Australian National University, Australia* *2. Length, Time and Optical Standards Section, National Measurement Institute, Australia* **Sub-frequency noise optical fibre strain sensing** We present a new interferometric technique for fibre strain sensing, where the system is immune to laser frequency fluctuations. We implement this digital post processing technique experimentally, demonstrating improvements of over 30 dB in resolution.
1640-1650	**Scott Foster**[1], Alexei Tikhomirov[1], Joanne Harrison[1] *1. Defence Science and Technology Organisation, Australia* **Fundamental limits on low frequency cavity fluctuations in optical fibre lasers** We present new experimental measurements of cavity fluctuations in short cavity fibre lasers at frequencies below 100Hz. The measured strain spectral density is less than 1picostrain/Hz^1/2 in a 0.6cm cavity at 5Hz corresponding to an equivalent length fluctuation of less than 10fm/Hz^1/2. We believe these results are the most sensitive measurements of free running cavity fluctuations in optical fibre yet reported.

Post Deadline Session 3 – Bayside Room 103

Chair: Halina Rubinsztein-Dunlop, The University of Queensland, AUSTRALIA

1600- 1610	**Haruka Tanji-Suzuki**[1,2,3], Wenlan Chen[1], Renate Landig[1], Jonathan Simon[2], Vladan Vuletic[1] *1. MIT-Harvard Center for Ultracold Atoms, Research Laboratory of Electronics, Massachusetts Institute of Technology, USA* *2. Department of Physics, Harvard University, USA* *3. NTT Basic Research Laboratories, NTT Corporation, Japan* **Vacuum-Induced Transparency** Using a cold atomic ensemble strongly coupled to an optical cavity, we demonstrate cavity-vacuum-induced transparency in a resonant medium, an accompanying group delay of the input pulse, and few-photon optical nonlinearity in the system.
1610-1620	H. M. Wiseman[1,2], D. A. Evans[1,2], C. Branciard[3], **E. G. Cavalcanti**[2], A. J. Bennet[1,2], D. J. Saunders[1,2], G. J. Pryde[1,2] *1. Centre for Quantum Computation and Communication Technology (Australian Research Council), Australia* *2. Centre for Quantum Dynamics, Griffith University, Australia* *3. School of Mathematics and Physics, University of Queensland, Australia* **Einstein-Podolsky-Rosen Steering with No Detection Loophole over 1 km of Optical Fibre** Demonstrations of nonclassical effects over long distances suffer from photon loss, opening the "detection loophole". Using new, loss-tolerant tests, we perform the first detection-loophole-free demonstration of EPR-steering with entangled photon pairs, over a 1km fibre.
1620-1630	Syed Assad[1], **Helen Chrzanowski**[1], Thomas Symul[1], Ping Koy Lam[1], Tim Ralph[2], Mile Gu[3], Vlatko Vedral[3]

	1. Centre for Quantum Computation and Communication Technology, Department of Quantum Science, The Australian National University, Australia *2. Centre for Quantum Computation and Communication Technology, Department of Physics, University of Queensland, Australia.* *3. Centre for Quantum Technologies, National University of Singapore, Singapore.* **A Functional Interpretation of Continuous Variable Quantum Discord** We show that quantum discord can quantify the information advantage of a quantum processing over an optimal classical processing. We experimentally extract a lower bound on the quantum discord of a non-entangled continuous-variable quantum system.
1630-1640	Damien Bonneau[1], Mirko Lobino[1], Pisu Jiang[1], Chandra M. Natarajan[2], Michael G. Tanner[2], Robert H. Hadfield[2], Sanders N. Dorenbos[3], Val Zwiller[3], Mark G. Thompson[1],**Jeremy L. O'Brien[1]** *1. Centre for Quantum Photonics, H. H. Wills Physics Laboratory & Department of Electrical and Electronic Engineering, University of Bristol, UK* *2. Scottish Universities Physics Alliance and School of Engineering and Physical Science, Heriot-Watt University, Edinburgh, UK* *3.Kavli Institute of Nanoscience, The Netherlands* **Fast Path and Polarisation Manipulation of Telecom Wavelength Single Photons in Lithium Niobate Waveguide Devices** We demonstrate fast electro-optic control of photons at 1550nm in lithium niobate waveguide devices. We show heralded single photon state engineering, fast state preparation of two entangled photons and feedback control of quantum interference.
1640-1650	**R. E. Scholten[1],** D. Murphy[1], A. J. McCulloch[1], S. D. Saliba[1], C. T. Putkunz[1], D. V. Sheludko[1] *1. ARC Centre of Excellence for Coherent X-ray Science, School of Physics, The University of Melbourne, Australia* **Arbitrarily shaped high-coherence electron and ion bunches from laser-cooled atoms** Cold electron and ion bunches are generated by laser excitation and photoionisation of laser cooled atoms. Arbitrary and real-time control of the electron and ion bunch shapes allows measurement of the source coherence and space-charge interactions.
1650-1700	**L. Huet[1, 2]**, M. Ammar[1, 3], E. Morvan[4], N. Sarazin[4], J.-P. Pocholle[1],J. Reichel[3], C. Guerlin[1, 5], S. Schwartz[1] *1. Thales Research and Technology, France* *2. Thales Underwater Systems, France* *3. Laboratoire Kastler-Brossel, Ecole Normale Supérieure Paris, France* *4. Thales III-V Lab, France* *5. LNE-SYRTE, Observatoire de Paris , France* **Magneto-optical Trapping and Detection of Atoms Through a Transparent Atom Chip** A magneto-optical trap with 10^8 87Rb atoms was formed near a transparent silicon carbide atom chip, with several beams propagating through the chip. Atomic detection through the chip and trap characterization are also reported.