MAX PLANCK INSTITUTE
for the science of light

Newsletter

n°3 | July 2011

THE GLASS STUDIO

The Glass Studio, headed by Dr Ralf Keding and supported by laboratory technician Günther Kron (formerly at Schott), is a recent addition to the TDSU* for fibre fabrication. It is dedicated to the development and production of high quality compound optical glasses with a wide range of different compositions. Several different types of crucible are available, including platinum for the production of germanate-silicate and borate glasses and gold for tellurite-based glasses. The studio has facilities for storage of raw materials, batch production, induction furnaces for glass melting and extrusion, as well as equipment for cutting, grinding and polishing. In collaboration with Prof Lothar Wondraczek at the University of Erlangen-Nuremberg, novel glasses are being developed for next-generation optical fibre devices, the primary focus being on heavy-metal oxide glasses transparent in the mid-IR. An extrusion tower specifically designed for production of canes for photonic crystal fibre manufacture is under construction at the moment – in a disused elevator shaft in the MPL building! Other personnel closely involved in the work are Dr Xin Jiang (postdoc in the Russell Division) and Fehim Babic (laboratory technician for fibre drawing). The photograph shows Ralf pouring the first glass melt at MPL. ■

* Technology Development and Service Unit

Contact: ralf.keding@mpl.mpg.de

Group: Glass Studio, TDSU for Fibre Drawing

MPL EVALUATION 2010

The biennial MPL evaluation took place from the 6th-8th December 2010. The advisory board included 2005 Nobel Prize winner Roy Glauber (Harvard University), Pierre Chavel (Institut d'Optique, Laboratoire Charles Fabry, France), Elisabeth Giacobino (Université Pierre et Marie Curie VI, CNRS - ENS, France), Satoshi Kawata (Osaka University, Japan), Peter Knight (retired Deputy Rector, Imperial College), Anthony Siegman (Stanford University, California), Orazio Svelto (Politecnico di Milano, Italy) and Wilson Sibbett (University of St Andrews, Scotland, UK). Johanna Stachel (Physikalisches Institut, Heidelberg) and Anton Zeilinger (University of Vienna) were appointed as observers by the Max Planck headquarters. ■

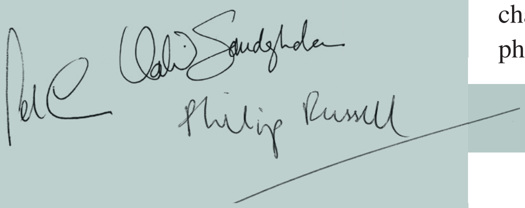
Nobel Prize Winner Prof Roy Glauber during lab visit

Foto: Josip Milanovic

Inside THIS ISSUE

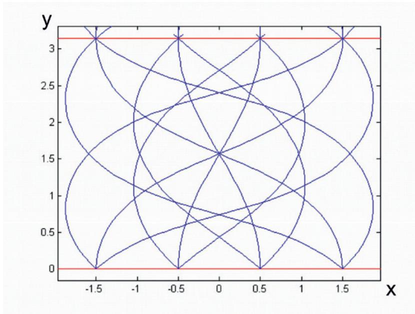
Message FROM THE DIRECTORS

The Institute is growing. Vahid Sandoghdar took office in February and his lab will move from Zurich to Erlangen in June. Even though the fourth division is as yet vacant, MPL is running out of space. With currently three independent research groups headed by Peter van Loock, Fabio Biancalana and Frank Vollmer and the expansion of the glass shop and the nanostructuring technology the building is filling up. Fortunately we have been able to rent additional rooms in a neighbouring building. With so much more research packed into the same space it is good to report that plans for the new building (scheduled for completion in 2014) are making good progress. In February 2011 a jury identified the winning design in an architects' competition. Compact, visually pleasing and economic, we are very happy with it. Although there will not be a lecture hall large enough for an MPL general assembly, the entrance area is large enough so that, in combination with the seminar room, a larger audience can be accommodated when necessary. The location offered to the Max Planck Society by the State of Bavaria is a short walk away from the university physics department, which is a big bonus for us. Although there has been some opposition by Erlangen citizens living near-by, who have enjoyed using the vacant construction site during the last decade, at the end of March the city council voted in favour of the construction of MPL. As a result everything is back on a good track. MPL was evaluated in December and our International Max Planck Research School, operated jointly with University colleagues, was under review in January all with a positive outcome. Details about the ongoing research are summarized for you in this newsletter. We appreciate your interest in our activities.



TDSU OPTICAL TECHNOLOGIES: INTERFEROMETRIC MEASUREMENTS

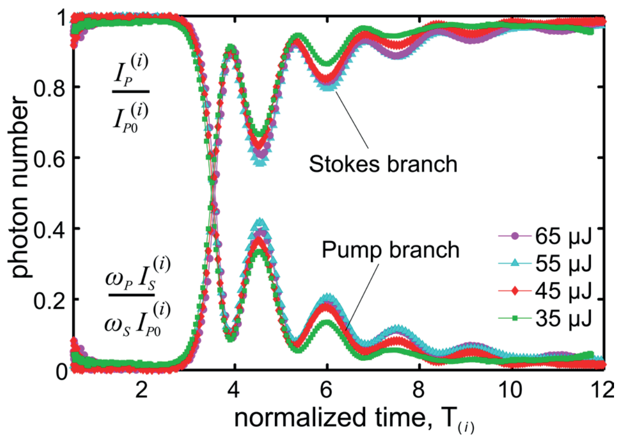
We investigate optical imaging systems that allow perfect imaging between general hypersurfaces in space. Such imaging is perfect in a geometrical optics sense, i. e., it is free of aberrations even for wide bundles of rays. Starting from Maxwell's fish eye in two dimensions, the formalism of transformation optics has been used to derive a two dimensional refractive index distribution that realizes perfect imaging between two parallel lines. Surprisingly, the resulting index distribution is well known: it is the famous hyperbolic secant profile routinely used in GRIN lenses today. Transformation optics now reveals an important, but as yet unknown property of the hyperbolic secant distribution: in two dimensions, it works as a perfect imaging device. In practice, however, aberrations are still generated owing to refraction at the boundaries of the element. Furthermore, the presence of skew rays leads to additional aberrations in real, three dimensional elements. In the future, we expect that transformation optics will provide new insights and novel optical designs that cannot be achieved by more traditional methods. ■



Contact: klaus.mantel@mpl.mpg.de
Group: *Interferometric Service Group*
Reference: Klaus Mantel *et al*., Opt. Lett. **36**, 199-201 (2011).

SELF-SIMILARITY IN EVOLUTION OF TRANSIENT STIMULATED RAMAN SCATTERING IN GAS-FILLED PHOTONIC CRYSTAL FIBRES

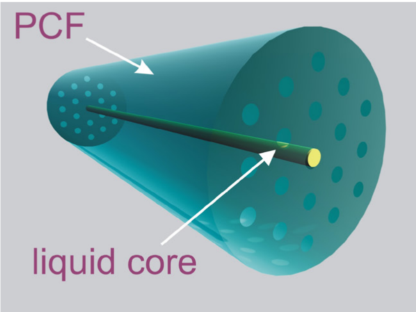
Coherent laser-matter interactions are of great theoretical and experimental interest and can exhibit quite diverse nonlinear behaviour. It turns out that fundamental processes such as pulse propagation in coherent absorbers and amplifiers and transient stimulated Raman scattering (SRS) can be treated in a universal way using sine-Gordon equation to describe the evolution of the Bloch vector. A fundamental hypothesis is that at long interaction lengths the spatiotemporal evolution of the sine-Gordon solutions should be self-similar, i.e., at each point in the medium the system should go through the same phases of temporal evolution but at a different time. In recent work we reported the first observation of self-similar behaviour in transient SRS, making use of the unique characteristics of gas-filled hollow-core photonic crystal fibre, i.e., long interaction lengths and spectral filtering. The figure shows the dependence of the normalized ratios of pump and Stokes intensities on the integrated intensity of the input pump pulse for different pump energies. The synchronous, damped oscillations of the ratios clearly show the self-similar oscillatory behaviour of the system. ■

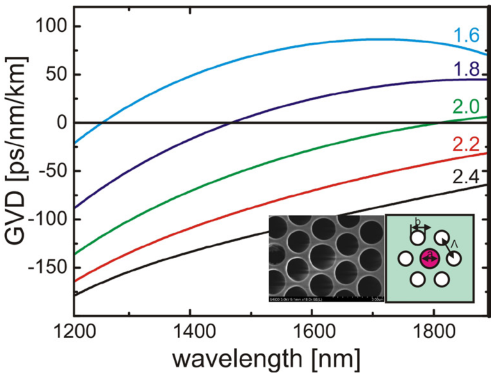


Contact: amir.abdolvand@mpl.mpg.de
Group: *Russell Division*
Reference: A. Nazarkin *et al*., Phys. Rev. Lett. **105**, 173902 (2010).

LINEARONS: SURPRISING MODES IN PCFS

When short and intense pulses travel inside solid-core silica fibres, they tend to form solitons – mathematical solutions of the nonlinear Schroedinger equation – universally used in fibre optics to describe the dynamics of light propagation. We recently discovered that, if the fibre core is made of a liquid possessing a very slow response to pulsed excitations (this is possible by using small capillaries or photonic crystal fibres, see figure on the left) a new kind of mode can propagate if the dispersive conditions are right (see figure on the right, showing the group velocity dispersion of liquid-core PCFs of different values of the pitch in µm). Such new modes (which we dub 'linearons') are solutions of a linear equation, but behave very much like normal solitons. This rather surprising conclusion may soon lead to improved supercontinuum generation in liquid-core photonic crystal fibres. ■

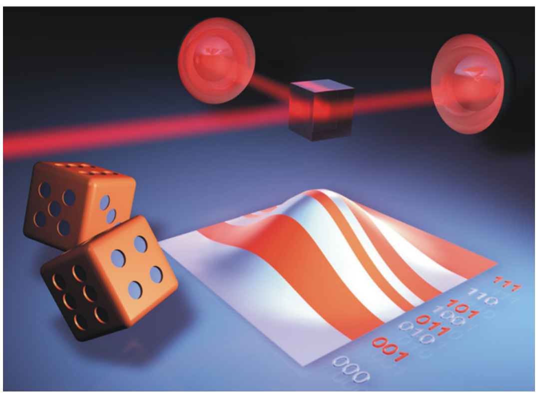




Contact: fabio.biancalana@mpl.mpg.de
Group: *Nonlinear Photonic Nanostructures (NPN)*
Reference: C. Conti *et al*., Phys. Rev. Lett. **105**, 263902 (2010).

CONTINUOUS VARIABLE QUANTUM RANDOM NUMBER GENERATOR

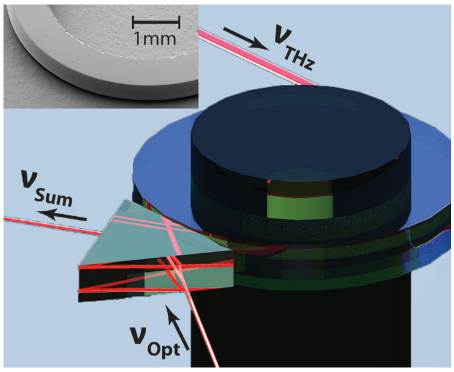
Random numbers highly relevant for a large variety of fields ranging from lottery games to simulations and cryptography. The production of truly random numbers for these applications is of great importance and poses a major challenge. We have exploited the intrinsic randomness of the quantum mechanical measurement process to produce such numbers. Existing quantum random number generators (QRNG) relied on the detection of discrete events. We use continuous variables and homodyne detection of a vacuum state which allows us to produce a reliable and fast QRNG in a compact setup. As the vacuum state is a pure state it guarantees the uniqueness of the produced random numbers. These numbers are generated by measuring the probability distribution of the incoming signal, dividing it into segments and assigning a certain bit combination to the measured values in each segment. Appropriate hashing functions are applied to eliminate all influence of technical noise not originating from the quantum measurement process. A device with a rate of 6.5 MBit/s has been demonstrated and speeds beyond 200 MBit/s seem possible. ■



Contact: christian.gabriel@mpl.mpg.de
Group: *Leuchs Division (QIV)*
Reference: C. Gabriel, *et al*., Nature Photonics **4**, 711-715 (2010).

TOWARDS SINGLE THZ PHOTON DETECTION VIA MULTI-RESONANT WHISPERING GALLERY MODE RESONATOR

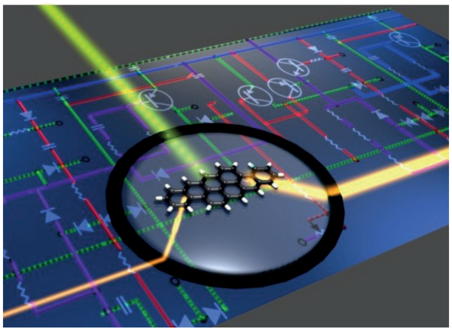
Detection of weak THz signals is very challenging due to the extremely low energy of one THz photon (temperature equivalent of 48K). Frequency up-conversion to the near infra-red and subsequent detection of the up-converted photon with sensitive, low-noise detectors is one way to achieve this task, albeit suffering from extremely poor conversion rates. Whispering gallery mode resonators, however, support well confined modes with high quality factors (Q) and extremely high field intensities inside the resonator, thus allowing efficient non-linear conversion rates. Our detection approach is based on nonlinear sum-frequency generation of a continuous wave THz and a CW 1550 nm signal in a LiTaO$_3$ WGM resonator. Mixing the two waves adds sidebands to the infrared signal, which can be easily measured. We are investigating a triply-resonant resonator which theoretically allows for unit photon conversion efficiency at sufficiently high Q-factors (Q_{opt} ~108, Q_{THz}~100) and moderate pump powers (~50mW). Currently we have achieved coupling of both optical and THz light into the same resonator, measuring Q factors within our proposed limits. Next steps will involve adjusting the resonances to fully harness the conversion efficiency. ■



Contact: harald.schwefel@mpl.mpg.de
Group: *Leuchs Division (WhiGaMoR)*
Reference: D. V. Strekalov *et al*., Phys. Rev. A **80**, 033810 (2009).

INTERROGATING LIGHT-MATTER INTERACTIONS ON THE NANOMETER SCALE

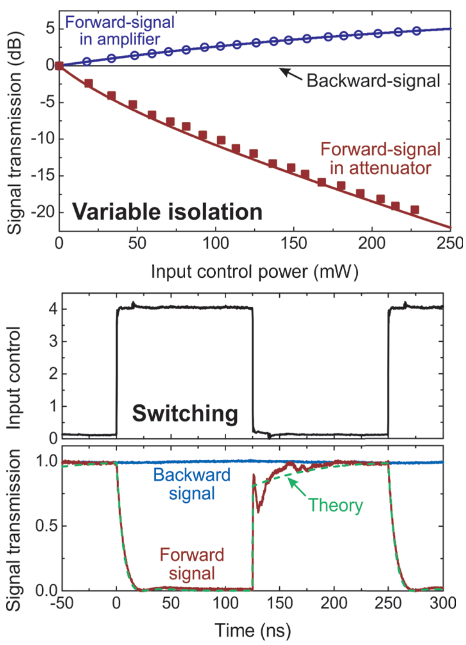
▸ Control of light-matter interaction has undergone a revolution in the past two decades. Although our theoretical understanding of the interaction between light and atoms became fairly mature already in the 1960s and 1970s, experimental progress has continued to change our way of thinking about many of the central phenomena. Ground breaking laboratory steps toward the control of light-matter interaction beyond simple spectroscopy were taken in the 1980s when single ions were detected in a trap and atoms were cooled and manipulated by laser light. In the 90s, this line of work established an important bridge between the gas phase quantum optics and solid-state physics by giving birth to Bose-Einstein condensation. Another important development of optical sciences that also took place in the 1990s was the detection of single molecules in the solid state with two separate approaches via optical microscopy and high-resolution laser spectroscopy. This line of work has had a tremendous impact in several areas of natural sciences, ranging from fluorescence microscopy in biology to semiconductor quantum dot spectroscopy and single photon generation and quantum optics. Some of the advantageous features of single-emitter optics are: 1) It is possible to study the same emitter at the same position for very long times. 2) Control of position and orientation of a single emitter allows one to access its near field. 3) Precision studies of single emitters under well-defined conditions give access to unprecedented control in solid-state optics. 4) On-chip realization of optical networks is possible with single solid-state emitters, opening doors to device applications. The scientific agenda of Prof Sandoghdar over the past decade has been to achieve the same degree of control and finesse that is known from the gas-phase quantum optics in the solid state. To do this, he has pursued a sophisticated combination of scanning probe technology, laser spectroscopy, cryogenic microscopy, nanofluidics, and concepts from quantum optics and has applied them to fundamental nano-optical studies in the condensed phase. Various novel experimental techniques put forth by the Sandoghdar group have contributed to areas in physical chemistry, optical microscopy, plasmonics, quantum optics, and biophysics. Some examples are: 1) Achieving strong nonlinear optical effects using single organic molecules and the realization of a single-molecule optical transistor. 2) Development of single molecules as single photon sources for quantum optical measurements. 3) Development of plasmonic nanoantennas for enhancing single-molecule fluorescence. 4) Ultrasensitive detection of nonfluorescent nano-objects and molecules. Professor Sandoghdar's laboratories move from Zurich to Erlangen in June. The group will expand its activities towards biophotonics with the emphasis on developing solutions for sensing, imaging and tracking biological nano-objects with ultrahigh spatial and temporal resolution. ■



Contact: vahid.sandoghdar@mpl.mpg.de
Group: *Sandoghdar Division*
Reference: J. Hwang *et al*., Nature **460**, 76 (2009).

RECONFIGURABLE OPTICAL ISOLATOR AND UNIDIRECTIONAL ATTENUATOR/AMPLIFIER

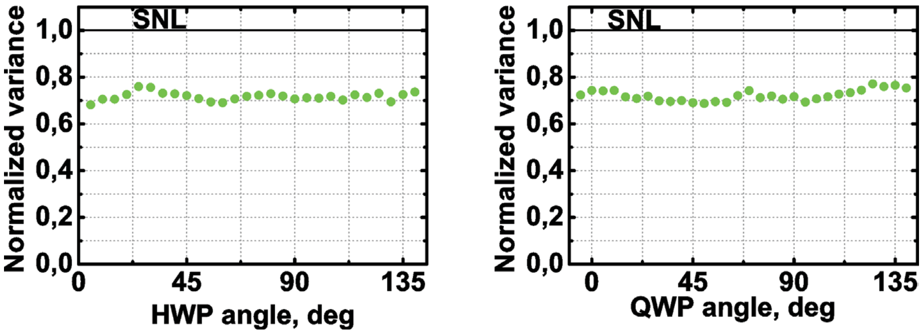
▸ Optical isolators are key components in lasers, amplifiers, optical communications and sensing systems. A recent challenge is the realization of optical isolators in more compact platforms without relying on the magneto-optical Faraday effect. We have recently demonstrated a reconfigurable optical isolator and unidirectional attenuator/amplifier in solid-core air-silica photonic crystal fibre (PCF). Coherent torsional-radial acoustic resonances (ARs), tightly guided in a micron-sized PCF core, can be excited by orthogonally polarized co-propagating pump and Stokes waves via forward stimulated inter-polarization scattering. While this AR in turn transfers power from pump to Stokes, it does not have the correct frequency-wavevector combination to cause coupling between any backward-propagating optical modes. We can therefore selectively attenuate or amplify only the forward-propagating signal by co-launching an orthogonally polarized control wave, while the transmission of the backward-propagating signal is unaffected. The all-optical reconfigurability of the device has several advantages over the conventional passive counterparts, e.g., a large dynamic range of isolation (> 20 dB), a high switching speed (< 20 ns) and reversibility. This device may be useful in advanced optical signal processing and optical communications. ■

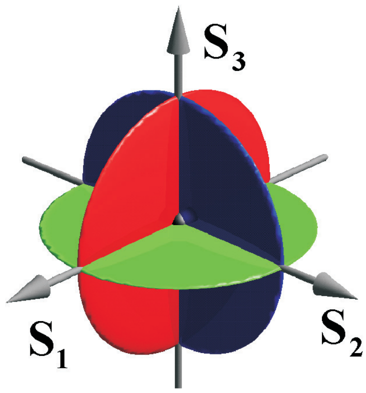


Contact: myeongsoo.kang@mpl.mpg.de
Group: *Russell Division*
Reference: M. S. Kang *et al*., post-deadline paper PD1.2, European Conference on Optical Communication, Torino (2010).

MACROSCOPIC PURE QUANTUM STATE FREE OF POLARIZATION NOISE

Recently, we have produced a bright state of light that, although being pure, is completely unpolarized. Also known as polarization-scalar light, it is the macroscopic analog of the singlet two-photon Bell state (MSBS). Surprisingly, it has photon numbers in two orthogonal polarization modes exactly equal regardless of the choice of these modes. Therefore both the mean values and the noise of all Stokes observables are, ideally, zero (black point at the origin). For each of the other three macroscopic Bell states, noise is suppressed only for one polarization observable (coloured disks). MSBS is interesting as a possible candidate for macroscopic Bell tests or for metrology applications.



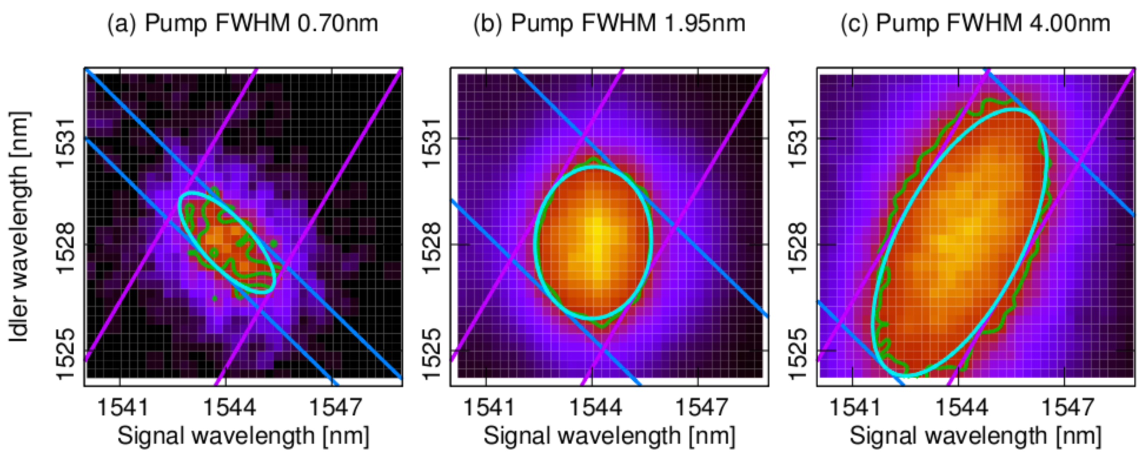


In experiment, MSBS was obtained by superposing two bright pulsed coherent orthogonally polarized two-colour squeezed vacuums. The state at the output contained about a million photons per pulse and manifested well-pronounced quantum properties. The obtained results demonstrate that the normalized variance of any arbitrary Stokes observable, chosen by fixing the orientation of a half-wave plate (HWP) and a quarter-wave plate (QWP) in a Stokes measurement setup, is nearly constant and 30% below the shot-noise level (SNL). This value is limited by the detection efficiency and the spatial mode mismatch, caused by the fact that beams of two different wavelengths are restricted by the same angular aperture. In future, proper spatial mode matching will improve polarization noise suppression and enable violation of separability condition for this state. ■

Contact: timur.iskhakov@mpl.mpg.de
Group: *TDSU Optical Technologies (single photon technology)*
Reference: Timur Sh. Iskhakov *et al*., Phys. Rev. Lett. **106**, 113602 (2011)

AN EFFICIENT SOURCE OF PULSED SINGLE-MODE TWIN-BEAMS

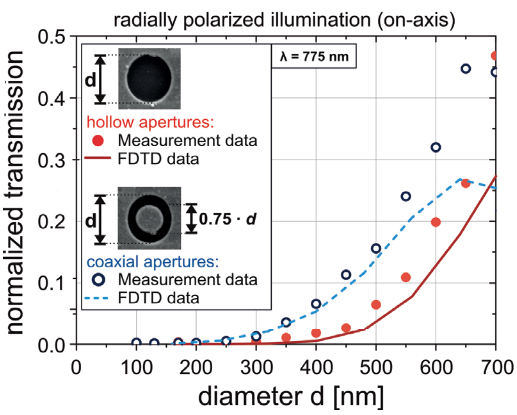
Many modern applications in quantum optics, from secure communication to metrology, rely on squeezed light. An established method for generating squeezed twin beams is type II parametric down-conversion (PDC). However, the generated beams are in general spatially and spectrally correlated and thus inherently multi-mode, effectively limiting the amount of usable squeezing. We have implemented a waveguide PDC source to generate genuine ultrafast single-mode pulses in the telecom band, featuring exceptional brightness and excellent spatial mode properties for easy integration into fiber- and on-chip optical circuits. Utilizing a single-mode waveguide in combination with spectral engineering, we are able to control and eliminate inter-beam frequency correlation (see figure) by shaping the ultrafast pump laser spectrum. With a mean photon number of 2.5 per 75pJ pump pulse (equivalent to 11dB of two-mode squeezing) in a single pass configuration, this is the brightest single mode pulse source up to date. ■



Contact: christine.silberhorn@mpl.mpg.de
Group: *Integrated Quantum Optics (IQO)*
Reference: Andreas Eckstein *et al*., Phys. Rev. Lett. **106**, 013603 (2011).

EXTRAORDINARY TRANSMISSION THROUGH A SINGLE COAXIAL APERTURE

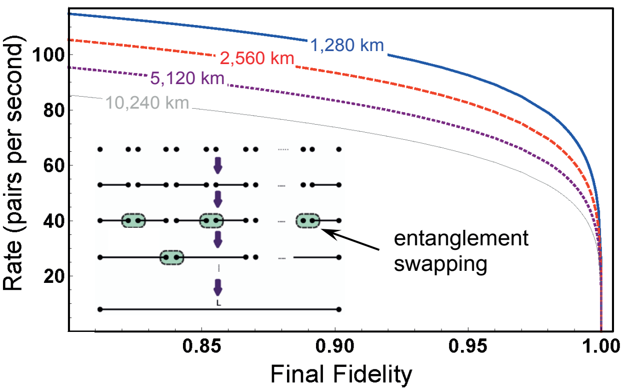
Since the pioneering work by Ebbesen et al. in 1998, many experimental and theoretical studies have been performed to gain insight into the processes leading to extraordinary transmission through arrays of nanoscale apertures. In a recent study, we investigated the transmission and waveguide properties of single sub-wavelength apertures (hollow as well as coaxial; see inset in figure) in metal films 110 nm thick. We used highly focused, polarization-tailored light beams (radially and azimuthally polarized). By illuminating a single hollow nanoaperture on-axis with highly focused and radially polarized light at a wavelength of 775 nm, the corresponding waveguide mode (TM_{01}) inside the aperture could be selectively excited. Under the experimental conditions, the TM01mode cuts off at a wavelength of 775 nm. In contrast, a TEM-mode can be excited in a coaxial aperture (core diameter 0.75d) using the same excitation scheme, but does not exhibit any cut-off. By placing a single photodiode underneath the sample, we gain information about the transmission properties for different aperture diameters d. An enhancement of up to four times enhanced transmission through the single coaxial aperture yielded four times higher transmission compared to a hollow aperture of the same outer diameter, despite the effective open area being much smaller. The experimental results are in good agreement with numerical simulations (dashed and solid lines in the figure). ■



Contact: peter.banzer@mpl.mpg.de
Group: *Leuchs Division (InMik)*
Reference: P. Banzer *et al.*, Optics Express, **18**, No. 10, pp. 10896-10904 (2010).

HUNDREDS OF HZ QUANTUM COMMUNICATION OVER THOUSANDS OF KM

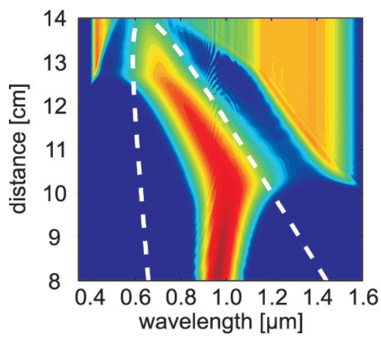
Quantum repeaters have been proposed to achieve long-distance quantum communication. Instead of employing the common procedures (such as amplification) used in classical communication, the total channel is divided into smaller segments and initially entanglement is distributed between nearest repeater stations. Entanglement swapping and distillation are then used to finally obtain entanglement over the entire communications link. In recent work we have presented a detailed rate analysis for a hybrid quantum repeater, where entanglement is created between atomic qubits through an optical coherent state. In a scenario with optimal state preparation, perfect memories, and sufficiently low local losses, but only two rounds of distillation at the very beginning, highly entangled pairs (F~0.98) can be created over thousands of km at rates of the order of 100 Hz. ■



Contact: peter.banzer@mplw.mpg.de
Group: *Optical Quantum Information Therory (OQI)*
Reference: Nadja K. Bernardes et al., Phys. Rev. A **83**, 012323 (2011).

SOLITON BLUE-SHIFT IN TAPERED PHOTONIC CRYSTAL FIBRE

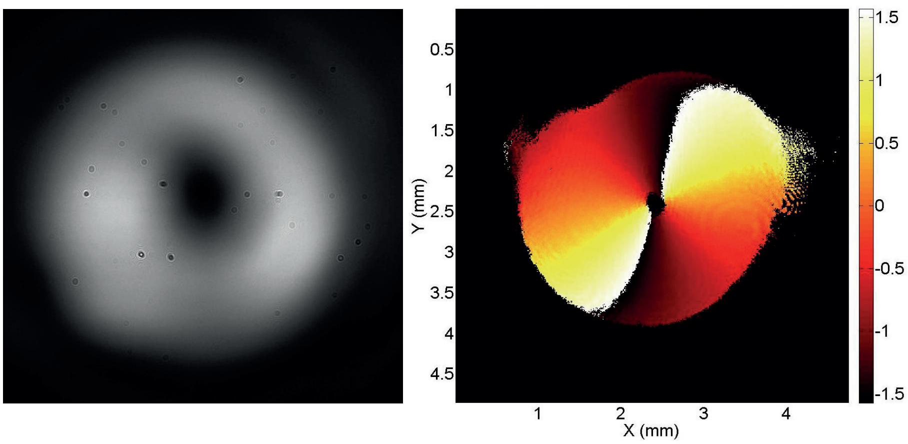
Optical fibre solitons enable the transmission of digital signals over long distances without distortion to the pulse shape. Fibres can also be engineered to manipulate the soliton characteristics, thus tailoring the "shape" of the laser light. We have recently studied soliton dynamics in PCFs with specially designed dispersion landscapes. Surprisingly, we have found that solitons can shift to higher optical frequency when propagating along a PCF with an axially-varying (tapered) structure. This is closely related to position-dependent zero-dispersion wavelengths, which move to shorter wavelength along the taper (the white dashed lines in the figure). The spectral evolution of the soliton along the tapered PCF shows soliton trapping in the long-wavelength section of the anomalous dispersion region. Tracking the long-wavelength zero-dispersion point, the soliton moves strongly into the red spectral range, with experimental shifts as large as 400 nm. The increase in soliton frequency is at expense of the pulse energy, dispersive radiation being continuously shed from the soliton. This demonstration of unusual soliton dynamics in PCFs delivers fresh concepts for soliton lasers and white-light sources. ■



Contact: sebastian.stark@mpl.mpg.de
Group: *Russell Division*
Reference: S. Stark *et al.*, Phys. Rev. Lett. **106**, 083903 (2011).

CONCENTRIC RING METAL GRATING FOR GENERATING RADIALLY POLARIZED LIGHT

Radially polarized light, when the polarization state is locally oriented in the radial direction, is important in both research and industry. We study the generation of radially polarized light with a concentric ring subwavelength aluminium grating. In principle this is a space-variant polarizer with its transmission axis oriented in the radial direction. The structural parameters of the local polarizers are designed for extinction ratio as high as 2000 so as to reduce the ellipticity angle. A concentric ring Al grating with a period of 200 nm, height of 200 nm and a duty cycle of 0.4 was written in resist using electron beam lithography and transferred to Al by reactive-ion etching. The element was illuminated with Gaussian circularly polarized light and the remaining vortex term ei eliminated by sending the transmitted light further through a phase plate with opposite spirality. After propagating for more than 1m, a radially polarized light with a doughnut intensity profile is obtained (left-hand figure). The right-hand figure shows the measured orientation of the linear polarization for this propagating mode. ■



Contact: zahra.ghadyani@mpl.mpg.de
Group: *Leuchs Division (ODEM)*
Reference: Qiwen Zhan, Adv. Opt. Photon. **1**, 1-57 (2009).

HUMBOLDT AWARD

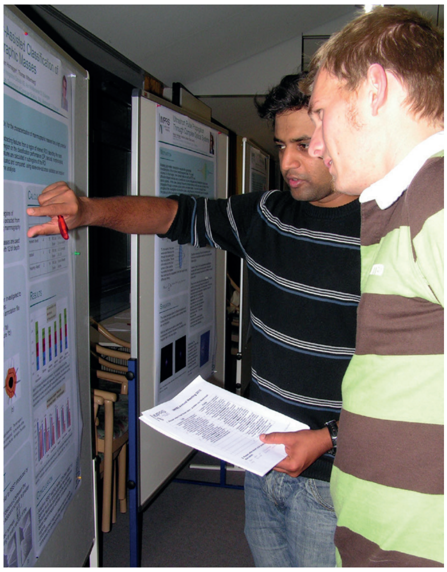
On 12 May 2011 Prof Vahid Sandoghdar, who recently joined MPL from ETH Zurich, was awarded a Humboldt Professorship in an award ceremony in Berlin. The Alexander von Humboldt professorships aim to help universities to recruit high-level international scientists to German universities. Only a few awards are conferred each year. Prof Sandoghdar will use his prize money to strengthen the collaboration between MPL and FAU. ■

From left to right: Karl-Dieter Grüske (Friedrich-Alexander-University Erlangen), Cornelia Quennet-Thielen (BMBF), Vahid Sandoghdar, Gerd Leuchs (both Max Planck Institute for the Science of Light and Friedrich-Alexander-University Erlangen), Helmut Schwarz (Humboldt Foundation)

Foto: Humboldt-Stiftung David Ausserhofer

IMPRS ANNUAL MEETING 2010

The IMPRS Annual Meeting was held 4-8 October 2010 in Behringers Tagungs- und Freizeithotel near Gößweinstein (Fränkische Schweiz). The scientific programme covered a wide range of topics in optics, photonics and imaging and included invited lectures, tutorials (blocks of three lectures), talks by students and a poster session. The meeting provided an opportunity for informal interactions between invited speakers, advisors and students. On the last day, after an afternoon hike to Gößweinstein and back, an outdoor barbecue was held around a campfire. In the course of the evening Marta Ziemienczuk received the award for the best student talk and poster prizes were given to Sarah Unterkofler, Attila Budai and Christian Weis. ■



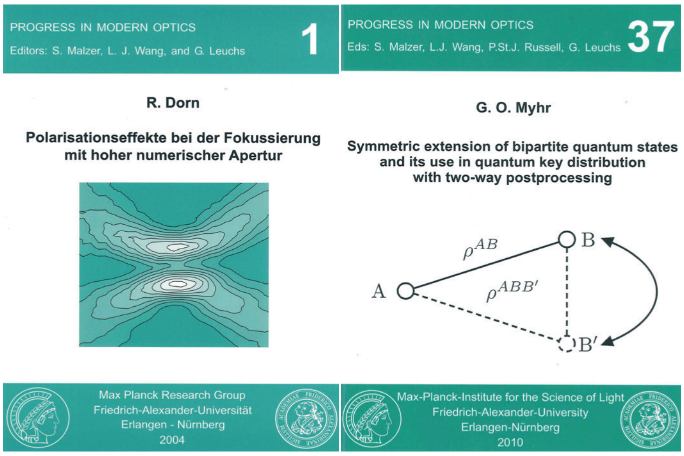
PhD students Krishnan Bharath Navalpakkam (FAU) and Florian Wagner (IIS), during the poster session

UPCOMING EVENT

The next **"Long Night of Science"** will take place during the night of 22-23 October 2011, from 18:00 to 01:00. The purpose of the event is to promote dialogue between scientists and the general public, to communicate the fascination and excitement of scientific research and to emphasize its important role in our culture and society. As on previous occasions, MPL will take part with laboratory demonstrations and exhibitions. ■

PROGRESS IN MODERN OPTICS (PMO)

Since 2004 doctoral theses written by students associated with the Institute of Optics, Information and Photonics at FAU have been released in a book series entitled "Progress in Modern Optics" (PMO). The editors are the MPL directors and Dr Stefan Malzer, who has the job of coordinating the printing process. The covers of the first volume in 2004 and the last volume (number 37) in December 2010 already tell a bit of MPL history. In 2004 Philip Russell's name does not yet appear on the cover because he did not join us until 2005. In addition, the Institute at that time was still operating under the name "Max Planck Research Group". Now the book series is published by the Max Planck Institute for the Science of Light. In 2011 the evolution continues with the arrival of Vahid Sandoghdar as a new MPL director and PMO editor. In an effort to keep the book series complete, every doctoral student at MPL is expected to publish their thesis in PMO. ■



Contact: stefan.malzer@physik.uni-erlangen

WELCOME

We welcome Dr habil **Maria V Chekhova** who will run the TDSU "Optical Technologies", specializing on single photon technologies. She was previously senior researcher at the Chair of Quantum Electronics headed by Prof V.I. Panov at the Lomonosov University in Moscow. She has been collaborating with the Leuchs Division for many of the past summers. From 1998 to 2001 she was visiting professor at the University of Maryland, 2008-2010 she was a Mercator-guest professor of the Deutsche Forschungsgemeinschaft and in 2009 she received a Piedmont Fellowship for Outstanding Visiting Scientists. We are all looking forward to working with her at the MPL. ■

NEWS IN BRIEF

Dr Gustavo Wiederhecker (Unicamp, University of Campinas) received the 2009 prize for the best Brazilian doctoral thesis in the area of Physics/Astronomy. During his PhD he spent protracted periods in Erlangen working in the Russell Division.

Prof Claudio Conti (University La Sapienza of Rome) and **Dr Shailendra K Varshney** (India) have received Research Fellowships from the Alexander von Humboldt Foundation. Prof Conti will work on novel nonlinear optical effects with Dr Fabio Biancalana and Dr Shailendra will work on nonlinear optical effects in gas-filled hollow-core photonic crystal fibres. Both visitors will be closely associated with the Russell Division.

The third MPL Director, **Prof Vahid Sandoghdar**, has been awarded an Alexander von Humboldt Professorship, the most valuable international research prize in Germany.

Dr Benjamin Sprenger has been chosen from a cohort of 34 of the youngest recent Max-Planck PhDs to be the recipient of the 2011 Dieter-Rampacher Prize. His PhD thesis was on the theme of "Stabilizing laser using whispering gallery mode resonators".

Prof Philip Russell has taken over from Prof Gerd Leuchs as MPL's managing director, a post he will hold for two years.

IN THE SPOTLIGHT

Silke Christiansen runs the Technology Development and Service Unit (TDSU) "Photonic Nanostructures". After studying Materials Science and completing her PhD and habilitation at the University of Erlangen-Nuremberg, she accepted a postdoc position at the Columbia University in New York City. Hard-working and resourceful, she likes to work steadily towards her goals and usually accomplishes whatever she set her mind to. During her career, she ran a scientific research group at the MPI for Microstructure Physics in Halle and a scientific junior research group at the Martin Luther University of Halle-Wittenberg, showing her good organizational skills and her competence at managing people. From 2009 to 2010 she led the Division for Semiconductor Nanostructures at the Institute of Photonic Technology (IPHT) in Jena. The focus of her research is material optimization in the fields of nanophotonics, photovoltaics, nano-electronics and sensing. Outside work, she enjoys skiing and inline-skating in particular with her kids and her partner. ■

Imprint

Publisher:
Max Planck Institute
for the Science of Light
Günther-Scharowsky-Str. 1 / building 24
D-91058 Erlangen

Enquiries:
presse@mpl.mpg.de

Coordination:
Daniela Benigni

Layout and Design:
Birke | Partner Kommunikationsagentur

www.mpl.mpg.de