BEWUSSTSEIN UND QUANTENCOMPUTER
CONSCIOUSNESS AND QUANTUMCOMPUTERS

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7. SCHWEIZER BIENNALE ZU WISSENSCHAFT, TECHNIK + ÄSTHETIK
THE 7th SWISS BIENNIAL ON SCIENCE, TECHNICS + AESTHETICS

20. / 21. Januar 2007 / January 20 - 21, 2007

Verkehrshaus der Schweiz, Luzern
Swiss Museum of Transport, Lucerne

Veranstalter: Neue Galerie Luzern, www.neugalu.ch
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A B S T R A C T S

Samstag, 20. Januar 2007 / Saturday, January 20, 2007
Verkehrshaus der Schweiz / Swiss Museum of Transport

Keynote
12.15 - 12.45 **BRIAN JOSEPHSON** Quantenphysik Cambridge / UK

IS QUANTUM MECHANICS OR COMPUTATION MORE FUNDAMENTAL?
IST DIE QUANTENMECHANIK ODER DAS RECHNEN FUNDAMENTALER?

Is quantum mechanics as currently conceived the ultimate theory of nature? In his book "Atomic Physics and Human Knowledge", Niels Bohr argued that because of the uncertainty principle quantum methodology might not be applicable to the study of the ultimate details of life. Delbruck disagreed, claiming that biosystems are robust to quantum disturbances, an assertion that is only partially valid rendering Bohr's argument still significant, even though normally ignored. The methods of the quantum physicist and of the biological sciences can be seen to involve two alternative approaches to the understanding of nature that can usefully complement each other, neither on its own containing the full story. That full story, taking into account the biological, cognitive, semiotic perspective, may involve anomalies that are incomprehensible from the standard physicist's point of view. It provides a fascinating challenge for the future of physics.

Ist die Quantenmechanik so, wie sie heute gedacht wird, die endgültige Theorie der Natur? In seinem Buch "Atomphysik und menschliche Erkenntnis" vertrat Niels Bohr die Meinung, dass die Methoden der Quantenmechanik aufgrund der Unschärferelation auf das Studium der Grundprinzipien des Lebens vielleicht nicht anwendbar seien. Delbruck widersprach mit der nur teilweise gültigen Ansicht, dass biologische Systeme unempfindlich für Störungen auf dem Niveau der Quanten seien, was der Meinung von Bohr, die vielfach übergangen wird, wieder Bedeutung verleiht. Die Methoden des Quantenphysikers und der biologischen Wissenschaften lassen sich als alternative Ansätze eines Naturverständnisses verstehen und können einander ergänzen. Allerdings kann keiner der Ansätze Vollständigkeit für sich beanspruchen. Eine vollständigere

Sichtweise, welche biologische, kognitive und semiotische Perspektiven berücksichtigt, könnte vielleicht auch Anomalien einschliessen, die aus der Perspektive des durchschnittlichen Physikers unverständlich erscheinen. Eine faszinierende Herausforderung für die Zukunft der Physik.

Brian Josephson is a Professor of Physics at the University of Cambridge, and a Fellow of Trinity College, Cambridge, and received his BA and Ph.D. degrees at the University of Cambridge. He is a Fellow of the Royal Society, and received a Nobel Laureateship in Physics for his work on tunnelling supercurrents. His more recent research interests include foundational issues in physics, theories of the brain, paranormal phenomena, music and consciousness, and the phenomenon of pathological disbelief (refusal to accept the reality of a phenomenon for which there is compelling experimental evidence).

12.45 - 12.55 **Diskussion / Discussion**
Leitung / chaired by **Dean Radin** Bewusstseinsforschung Petaluma / USA

Keynote
12.55 - 13.25 **RAINER BLATT** Quantenphysik Innsbruck / A

QUANTENCOMPUTER – TRAUM UND REALISIERUNG
QUANTUMCOMPUTERS – DREAM AND REALIZATION

Rechenoperationen beruhen immer auf realen physikalischen Prozessen, beginnend mit der Dateneingabe, über die Datendarstellung im Speicher, die Datenmanipulation in Form von Algorithmen bis hin zur Ausgabe der Endresultate. In herkömmlichen Computern können diese Prozesse klassisch beschrieben werden. Theoretisch ist seit einigen Jahren bekannt, dass mit quantenmechanischen Prozessen bestimmte Rechenoperationen sehr viel effizienter durchgeführt werden können. Daher besteht ein großes Interesse, einen Quantencomputer zu bauen. Dies erfordert die Implementierung von Quantenbits, Quantenregistern und Quantengattern sowie die Entwicklung von Quantenalgorithmen. In diesem Vortrag werden mehrere Techniken zur Realisierung von Quantencomputern vorgestellt. Besonders werden Experimente mit gespeicherten Ionen in linearen Paul-Fallen zur Darstellung von Quantenregistern und Quantengattern diskutiert. Verschränkte Zustände mit bis zu acht qubits wurden erzeugt und es wurde so demonstriert, dass damit Quantenregister verfügbar sind, die präpariert und skalierbar kontrolliert werden können für die Anwendungen in einem Quantencomputer. Mit Bell-Zuständen als Ressource finden verschränkte Zustände für die Teleportation und für effiziente Präzisionsmessungen erste Anwendungen.

Computational operations always rely on real physical processes, which are data input, data representation in a memory, data manipulation using algorithms and finally, the data output. With conventional computers all the processes are classical processes and can be described accordingly. Theoretically, it is known for several years now that certain computations could be processed much more efficiently using quantum mechanical operations. This requires the implementation of quantum bits (qubits), quantum registers and quantum gates and the development of quantum algorithms. Several approaches for the implementation of quantum computers will be presented, with special emphasis on the ion storage techniques. Experimental realizations of quantum registers and quantum gate operations using strings of trapped ions in a linear Paul trap will be discussed. Entangled states of up to eight ions have been created and it was thus demonstrated that quantum registers can be prepared and manipulated for applications with a quantum computer. With Bell states as a resource entangled states are applied for teleportation and for improved precision measurements.

Rainer Blatt, born 1952 in Germany, received his Ph.D. in physics at University of Mainz in 1981. After being a research associate in Mainz in 1981-1982, he was a postdoctoral fellow at the Joint Institute of Laboratory Astrophysics (JILA), Boulder, Co, USA, from 1982-1984 working with J. L. Hall on atomic beam cooling with chirped lasers. From 1984-1994 he worked at the University of Hamburg as research associate and as Heisenberg fellow, and finished his Habilitation thesis in 1988. After being associate professor with the University of Göttingen, Germany, he accepted an offer as full professor at the University of Innsbruck in 1995 where he is currently the director of the Institute of Experimental Physics. Since 2003 he is Director of the newly founded Institute for Quantum Optics and Quantum Information of the Austrian Academy of Science in Innsbruck.

13.25 - 13.35 **Diskussion / Discussion**
Leitung / chaired by **Karl Knop** Physik Baar / Schweiz

Karl Knop, born in Zurich in 1943, studied physics at the Federal Institute of Technology, and he received his Ph.D. in solid state physics. His research interests include micro optics, semiconductor imager sensors and color cameras, and semiconductor technology. As director of the Zurich based RCA Laboratories, Karl Knop was responsible for the transfer of these labs to the newly founded Paul Scherrer Institute, PSI, where he was instrumental in creating the lab's focus on micro-

and nanostructures. At PSI he accompanied the start of new research activities such as semiconductor laser physics and photovoltaics. In 1987, the PSI Zurich lab became part of CSEM, the Swiss Center for Microelectronics and Microtechnology in Neuchâtel, responding to new challenges in the field of nanotechnology and polymer optoelectronics, and resulting in the creation of start-ups and spin-off companies. Karl Knop is a member of the Swiss Society for Optics and Microscopy SSOM which he headed as president between 1995-2001. He is a member of the Swiss Academy for Technical Sciences, SATW, and president of the commission for nanotechnology. In 2004 Karl Knop became CEO of i4u GmbH, a consulting company for research, technology and innovation offering his knowledge and experience to a number of commercial and non-profit organizations.

13.35 - 14.00 **Pause / Break**

Intervention

14.00 - 14.45 **JEAN-CHRISTOPHE AMMANN** Kunstgeschichte
Frankfurt am Main / Deutschland

KREATIVITÄT UND INNOVATION – CREATIVITY AND INNOVATION

Innovation setzt Kreativität voraus. Jedoch werden beide Begriffe, auch wenn verschiedenen Bereichen zugeordnet, häufig als Synonyme betrachtet. Innovation und Kreativität sind komplementäre Begriffe. Es gab eine Zeit, da hat die Kreativität – ich denke an die Künstler und Künstleringenieure – die Innovation befördert. Dann kam der Umkehrschub: Die Innovation liess die Kreativität explodieren. IT hat die Kreativität in einem Masse beflügelt, dass sie sich zu einem Welterschliessungsmodell entwickelt hat. Jedoch ist Kreativität nicht mit Kunst gleichzusetzen. Künstler sind dahingehend innovativ, als sie den Weg, den sie beschreiten, selbst schaffen müssen: Als ein individueller, durch die Persönlichkeit strukturierter Werkbegriff.
Innovationen sind fortschrittsabhängig. Kreativität ist eine Ressource. Die am wenigsten genutzte, so der Wirtschaftstheoretiker Leo A. Nefiodow in seinem Buch "Der Sechste Kondratieff". Kunstwerke sind im besten Falle fortschrittsunabhängig, aus welcher Zeit auch immer sie stammen mögen. Die Künste erforschen den anthropologischen Resonanzraum. Das Erstaunliche im Bereich der Innovationen (Forschung) ist, dass, je tiefer man beispielsweise in den subatomaren Bereich vordringt, desto grösser das Mysterium wird. Die vedische Weltansicht (1500 v. Chr.) sprach von einer kosmischen Ordnung, die der Upanishaden (1200 v. Chr.) ergänzte die kosmische Ordnung mit einem kosmischen Bewusstsein. – Das Atemberaubende an Kreativität (Intuition) und Innovation (Intelligenz/laterales Denken) ist die Konversion auf ein Ursprungsmodell, das die indische Philosophie erahnte und das abendländische Denken über die Wissenschaft erforschen musste. Demzufolge gilt es, die Kreativität nicht als Zulieferer von Innovationen zu betrachten, sondern als eine Form von Weisheit ins Auge zu fassen, die verhindert, was Georg Christoph Lichtenberg (1742 – 1799) auf den Punkt gebracht hat: "Der Mann hat so viel Verstand, dass er fast zu nichts mehr in der Welt zu gebrauchen ist".

Innovation presupposes creativity. Although the two terms are classified as belonging to different domains they are frequently considered synonymous. Innovation and creativity are complementary terms. There was a time – I am thinking of artists and artist-engineers – when creativity fostered innovation. But then the effect was reversed: innovation caused creativity to explode. IT has become a tremendous source of inspiration for creativity, turning it into a model how to make the world accessible. However, creativity is not the same as art. Artists are innovative by treading their own new paths: as individuals who structure their personal working approaches.
Innovation is dependent on progress. In his book "The Sixth Kondratieff" Leo A. Nefiodow, theorist and economist, considers creativity to be the resource which is used the least. Whatever period it stems from, a piece of art is at its best independent of progress . The arts explore the anthropological space of resonance. With regard to innovation (research) it is surprising that the more we push forward into the subatomic realm, the deeper our mysteries become. The Vedic world view (1200 BC) incorporated a cosmic order, the Upanishads (1200 BC) completed the cosmic order with a cosmic consciousness. – What is so breathtaking about creativity (intuition) and innovation (intelligence/lateral thinking) is the conversion to an Ur-model already imagined by Indian philosophy and explored by science in occidental thinking. Accordingly, creativity should not be conceived as a supplier of innovation but as a form of wisdom preventing us from what Georg Christoph Lichtenberg (1742 – 1799) put in a nutshell by saying: "Man has developed so much intelligence that the world has hardly any use for it anymore".

Jean-Christophe Ammann was born in Berlin in 1939. Ph.D. at the University of Fribourg, Switzerland in 1966. Director of the Kunstmuseum Lucerne, Switzerland, 1968-77. Kunsthalle Basel, Switzerland, 1978-88. Museum für Moderne Kunst, Frankfurt a. M., Germany, 1989-2001. Commissar of the German Pavillion of the Venice Biennial, Italy, 1995. Lecturer at the University Frankfurt a. M. and Giessen since 1992, at the University of Heidelberg in 2001-02. Author: Rémy Zaugg – Discussion with Jean-Christophe Ammann (1994 together with Harald Szeemann). Von Hodler zur Antiform (1968). Louis Moilliet: Das Gesamtwerk (1972). Bewegung im Kopf. Vom Umgang mit der Kunst (1993). Kulturfinanzierung (1995). Annäherung. Über die Notwendigkeit von Kunst (1996). Das Glück zu sehen (1998). Co-Organizer of the Documenta 5, Kassel (1972). Curator: Van Gogh bis Beuys, Ausstellungshalle, Bonn (2005). In the Beginning the Word ... About Language in Contemporary Art (with Corrina Thierolf), Haus der Kunst, Munich (2006). Decorated Officier De Arts et Des Lettres, Goethe-Medal of the City of Frankfurt, Germany. Culture Award, Wormland Foundation (2001). Herbert Zapp Award for Cultural Excellence (2006).

Leitung / chaired by **Ingeborg Reichle** Kunstgeschichte und Philosophie Berlin / Deutschland

Ingeborg Reichle has been engaged in interdisciplinary studies in London and Hamburg. She holds an MA in Art History from the University of Hamburg and received her Ph.D. from the Humboldt-University in Berlin in 2004. Her doctoral dissertation is about art, artificial life and biotechnology in the age of technoscience. It was published in 2005 by Springer Vienna / New York under the title "Kunst aus dem Labor. Zum Verhältnis von Kunst und Wissenschaft im Zeitalter der Technoscience". Reichle is currently a lecturer at the Hermann von Helmholtz-Zentrum für Kulturtechnik at the Humboldt-University in Berlin and a research fellow at the Berlin-Brandenburg Academy of Sciences and Humanities where she is a member of the interdisciplinary research group "The World as an Image". The history of the "world as an image" ranges from cosmological models of the Ancient World to the most recent computer generated visualizations in the life sciences which encompass a broad spectrum of visual media including computer visualizations, graphics, cartography and diagrams. From the perspective of the "iconic turn" these media have become a central focus of scientific research interests. The interdisciplinary research group is aiming at – from a historical and a systemic perspective – the study and investigation of the visual representations of world concepts which includes an analysis of scientific visualizations and models.

Keynote

15.00 - 15.30 **KLAUS HEPP** Theoretische Physik / Neurowissenschaften Zürich / Schweiz

QUANTENMECHANIK UND HÖHERE GEHIRNFUNKTIONEN: ERFAHRUNGEN AUS DEM QUANTUM COMPUTING UND AUS DER NEUROBIOLOGIE
QUANTUM MECHANICS AND HIGHER BRAIN FUNCTIONS: LESSONS FROM QUANTUM COMPUTING AND NEUROBIOLOGY

Die Beziehung zwischen Quantenmechanik und den höheren Gehirnfunktionen ist ein umstrittenes Thema, das beim ungezwungenen Zusammentreffen von Akademikern, die für die Diskussion offen sind, für Unterhaltung sorgt. Häufig ist es jedoch auch ein debattierter Gegenstand an internationalen Konferenzen, in Gremien, die Unterstützungsgelder sprechen und es mag sich vielleicht gar um eine Lebensfrage handeln, die man im Kontext mit den uns herausfordernden letzten Fragen sehen kann. Eine umfassendes und sachliches Verständnis von Antworten auf diese Frage ist gewiss wünschenswert. – Im ersten Teil meines Vortrags gehe ich auf die bislang getätigten Anstrengungen ein, die höheren Gehirnfunktionen mit der Quantenmechanik zu erklären und werde dabei auf zahlreiche Erklärungslücken verweisen. Im zweiten Teil beziehe ich mich auf das theoretische und experimentell-gewonnene Verständnis des vergangenen Jahrzehnts beim Quantum Computing. Ich vertrete die Meinung, dass die Quantenmechanik bei der Erklärung der höheren Gehirnfunktionen eine schwache Position vertritt. Im letzten Teil des Vortrags stelle ich einen klassischen sich abzeichnenden Ansatz für das Verständnis der höheren Gehirnfunktionen zur Diskussion (der sich im Wesentlichen auf die klassische Physik und Chemie stützt). Er ermöglicht neuartige überraschende Einsichten, die auch das Bewusstsein miteinbeziehen.

The relationship between quantum mechanics and higher brain functions is an entertaining topic debated at parties among open-minded academics. However, it is also an issue frequently debated at international conferences, in funding agencies, and it may even become a lifetime question challenging us to find answers to the ultimate truth. In any case, a well-founded comprehension of these issues is certainly desirable. – In the first part of my talk, I will scrutinize past efforts that used quantum mechanics to explain higher brain functions, and I will expose several explanatory gaps. In the second part, I will turn to theoretical and experimental insights obtained during the past decade in quantum computing. I will argue that quantum mechanics is not able to explain higher brain functions. In the last part of my talk, I will discuss a classical theory of higher brain functions (essentially based on classical physics and chemistry) in process which offers novel and surprising insights encompassing the topic of consciousness.

Klaus Hepp was born in 1936 in Kiel, Germany. He studied mathematics and physics at the University of Münster and at the Swiss Federal Institute of Technology (ETH) in Zurich. He received his Ph.D. at the ETH in 1962. Between 1964 and 1966, he was a member of the Institute for Advanced Study, Princeton, NJ.. He has been a professor of theoretical physics at the ETH since 1966. Hepp has made important contributions to quantum field theory, quantum optics, and to the understanding of the neurobiology of eye movements. He is currently professor emeritus at the Institute of Neuroinformatics at the ETH in Zurich. In 2004 Klaus Hepp was awarded the Max-Planck-Medal.

15.30 - 15.40 **Diskussion / Discussion**
Leitung / chaired by **Hans-Peter Dürr** Quantenphysik München / Deutschland

Keynote

15.40 - 16.10 **HENRY STAPP** Physik Berkeley

HOW OUR THOUGHTS CAN INFLUENCE OUR ACTIONS
WIE UNSERE GEDANKEN UNSERE HANDLUNGEN BEEINFLUSSEN KÖNNEN

Science is basically about correlations between conscious human experiences: that is what makes it both useful and testable in the realm of our expanding human knowledge. Explicit recognition of this understanding lies at the core of the formulation of quantum theory that was originally developed during the twenties by its founders. In the prior classical physical theory consciousness played no dynamical role: it entered as a passive witness to a process completely and deterministically described in a mathematical language suited to describing tiny rock-like particles interacting with electromagnetic and gravitational fields. But the transition from classical physics to quantum physics converted this physical description of the presumed material realities of the earlier theory into a description of potentialities for the occurrence of "events". Each such event has both a psychologically described aspect, which specifies an entry of a conscious event into a stream of consciousness, and also a physically described aspect, which is expressed in the language of the quantum mathematics. The latter aspect of the event specifies a restriction of the prior set of mathematically described potentialities to a reduced set that is compatible with the increased knowledge generated by the associated entry of a conscious experience into the stream of consciousness.
Von Neumann expanded the original Copenhagen formulation so that each of these psycho-physical events occurs physically in the brain of a conscious agent/witness, and occurs psychologically in his or her stream of consciousness. The mind-brain interaction becomes, thereby, a central element of the theory. The quantum dynamics involves a "Process 1", which is connected to choices made by the human experimenter, but is controlled by no known law of physics. It will be argued that this "causal gap" in contemporary physical theory allows the psychologically described aspects of nature to enter irreducibly into mind-brain dynamics.

Die Wissenschaft handelt grundsätzlich von Korrelationen zwischen bewussten menschlichen Erfahrungen: Das macht sie im Bereich unseres sich erweiternden Wissens sowohl nützlich wie auch (über)prüfbar. Im Kern der Aussagen der Quantenmechanik, welche in den zwanziger Jahren entwickelt worden ist, steckt die ausdrückliche Anerkennung eines solchen Verständnisses. In der vorangehenden klassischen physikalischen Theorie spielte das Bewusstsein keine dynamische Rolle ausser der eines passiven Zeugen eines in mathematischer Sprache vollständig und deterministisch beschreibbaren Prozesses, der winzige mit elektromagnetischen und Gravitationsfeldern interagierende Steinchen ähnelnde Teilchen beschreibt. Doch mit dem Übergang von der klassischen zur Quantenphysik ging die physikalische Beschreibung der mutmasslichen materiellen Wirklichkeit der früheren Theorie in eine Beschreibung von Potentialitäten für das Auftreten von "Ereignissen" über. Jedes dieser Ereignisse hat sowohl einen psychologisch beschriebenen Aspekt, der den Eintritt eines bewussten Ereignisses in einen Bewusstseinsstrom spezifiziert, wie auch einen physikalisch beschriebenen Aspekt, der in der mathematischen Sprache der Quantenmechanik zum Ausdruck gebracht wird. Der letztere Aspekt des Ereignisses spezifiziert eine Einschränkung der vorangegangenen Setzung der mathematisch beschriebenen Potentialitäten auf eine reduzierte Setzung, die mit dem angewachsenen Wissen vereinbar ist, das durch den damit in Verbindung stehenden Eintritt einer bewussten Erfahrung in einen Bewusstseinsstrom generiert wird.
Von Neumann erweiterte die ursprüngliche Kopenhagener Formulierung, sodass jedes einzelne dieser psycho-physikalischen Ereignisse physisch im Gehirn eines bewussten Agenten/Zeugen stattfindet, d.h. psychologisch in seinem bzw. ihrem Bewusstseinsstrom. Die Gehirn-Geist-Interaktion wird dadurch ein zentrales Element der Theorie. Die Quantendynamik involviert einen "Prozess 1", der mit den Wahlmöglichkeiten eines menschlichen Experimentierers in Beziehung steht, doch durch kein bekanntes Gesetz der Physik kontrolliert wird. Meine Sichtweise ist, dass diese "kausale Lücke" der zeitgenössischen physikalischen Theorie den psychologisch beschriebenen Aspekten der Natur einen unreduzierten Eintritt in die Geist-Gehirn-Dynamik erlaubt.

Henry P. Stapp is a senior physicist at the Lawrence Berkeley Laboratory at the University of California, Berkeley, who, in the course of a half-century career in science, has made major contributions to our understanding of quantum theory. A graduate of the University of Michigan, he wrote his doctoral thesis under the direction of the Nobel laureates Emilio Segre and Owen Chamberlain, and earned a Ph.D. in physics from Berkeley in 1955. His dissertation provided a theoretical framework for the analysis of the scattering of polarized protons on polarized targets, which he subsequently used to analyze data obtained from experiments being conducted at Berkeley's Lawrence Radiation Laboratory in the first large-scale computer analysis in high energy physics. In 1958, he accepted the invitation of Wolfgang Pauli to work with him at the Eidgenössische Technische Hochschule (ETH) in Zurich on fundamental problems in quantum theory. An essay he wrote then on "Mind, Matter, and Quantum Mechanics" was developed into a book of the same title, which was published thirty-five years later by Springer. Henry Stapp was named to his present position at Berkeley in 1962, and during the sixties, he was a principal mathematical and philosophical spearhead for the then new approach to quantum theory known as S-matrix theory. He proved, within the S-matrix framework, two basic theorems in elementary particle physics and an array of fundamental discontinuity equations. His thesis work on spin-correlation experiments led to intense involvement with Einstein-Podolsky-Rosen non-locality and to a large set of extensions of Bell's famous non-locality theory. As a visiting scientist, he worked in Munich at the Max-Planck Institute with

Werner Heisenberg and at the University of Texas, Austin, with John Wheeler. His 1972 paper "The Copenhagen Interpretation" is widely recognized as a seminal work on the subject. Dr. Stapp's latest research focuses on the possible strong influence of quantum processes on the human brain, specifically on how the quantum Zeno effect can account for the ability of a person's conscious choices to causally influence his or her physical actions. He is the author of more than three hundred scientific papers, and, in recent years, he has written and lectured extensively on the social impact of such a revised understanding of the nature of human agency.

16.10 - 16.20 **Diskussion / Discussion**
Leitung / chaired by Brian Josephson Quantenphysik Oxford / UK

16.20 - 16.45 **Pause / Break**

16.45 - 18.00

DO QUANTUMCOMPUTERS MAKE MINDS?

Podiumsgespräch und Diskussion 1. Tag / Panel Discussion 1st Day
mit / with **JEAN-CHRISTOPHE AMMANN, RAINER BLATT, HANS-PETER DÜRR, KLAUS HEPP, BRIAN JOSEPHSON, KARL KNOP, DEAN RADIN, INGEBORG REICHLE, HENRY STAPP**

Leitung / chaired by **Peter Weibel** Kunst- und Medientheorie Karlsruhe

Peter Weibel, born in Odessa in 1944, studied literature, medicine, logic, philosophy and film in Paris and Vienna. He became a central figure in European media art due to his activities as an artist, media theorist and curator. Since 1984 he has been a professor at the University of Applied Arts in Vienna. From 1984 to 1989 he headed the Digital Arts Laboratory at the Media Department of the New York University, Buffalo. In 1989 he founded the Institute of New Media at the Städelschule in Frankfurt a. From 1986 until 1995, Weibel acted as an artistic consultant and later as the artistic director of Ars Electronica, Linz, and as a commissioner of the Austrian pavillions at the Venice Biennale from 1993 to 1999. Since 1993 he has been a curator at the Neue Galerie Graz and since 1999 the chairman and CEO of the Center for Art and Media (ZKM) in Karlsruhe. Selected publications: Jenseits von Kunst, Peter Weibel (Ed.) Vienna: Passagen (1996); Inklusion: Exklusion. Kunst im Zeitalter von Postkolonialismus und globaler Migration, Peter Weibel (Ed.) Cologne: DuMont (1997); net_condition. art and global media, Timothy Druckrey, Peter Weibel (Eds.) Cambridge / Mass: MIT Press (2000); Iconoclash. Beyond the Image Wars in Science, Religion, and Art, Bruno Latour, Peter Weibel (Eds.) Cambridge / Mass: MIT Press (2002); Making Things Public – Athmospheres of Democracy, Bruno Latour, Peter Weibel, Cambridge / Mass: MIT Press (2005); Peter Weibel. Das offene Werk. 1964-1979, Peter Weibel (Ed.) Stuttgart: Hatje-Cantz (2006).

Sonntag, 21. Januar 2007 / Sunday, January 21, 2007
Verkehrshaus der Schweiz / Swiss Museum of Transport

12.00 - 12.15 **Programmüberblick / Presentation of the Programme**

Keynote
12.15 - 12.45 **HANS-PETER DÜRR** Quantenphysik München / Deutschland

CARTE BLANCHE

Hans-Peter Dürr, born 1929 in Stuttgart, is a German physicist. In addition to nuclear and quantum physics, elementary particles and gravitation, epistemology, and philosophy, he was and is engaged in advocating responsibility of scientists and sustainability policies. From 1978 to 1980 he was executive director of the Max Planck Institute for Physics and Astrophysics (former Kaiser Wilhelm Institute for Physics, Berlin), and 1971, 1978-1980, 1987-1992, respectively 1972-1977, 1981-1986, 1993-1995) executive director or vice executive

director at the Max Planck Institute for Physics (Werner Heisenberg Institute) in Munich, Germany, as well as since 1969 professor of physics at the Ludwig Maximilian University in Munich, retiring (Emeritus) 1997. After studying physics (diploma 1953) at the Technical University in Stuttgart, he received 1956, under guidance of Edward Teller, his Ph.D. at the University of California in Berkeley. 1962 he was guest-professor in Berkeley, California and later in Madras, India. For 18 years (1958-1976) he worked closely with Werner Heisenberg on a fundamental quantum field theory of matter. In 1976, he got involved in the atomic energy issue on a general and communal level, protesting against a nuclear fuel reprocessing plant in Bavaria, and became after Tshernobyl one of the founders of 'David against Goliath'. In the 1980´s, Dürr got involved in the peace movement as a member and later council member of the Pugwash Conferences on Science and World Affairs (Peace Nobel Prize 1995). In 1983, he helped create the Scientist's Initiative: Responsibility for Peace, which led to the Scientists' Peace Congress in Mainz attended by 3'300 scientists and the Mainzer Appell, which was a declaration against further nuclear armament. In 1990, at another huge scientist´s convention in Göttingen he warned against the militarization of space. In support of these conventions, Dürr gave a series of lectures at many German universities. Dürr is a leading critic of the American Strategic Defense Initiative (SDI), known as Star Wars. In 1985 he proposed a World Peace Initiative WPI, on a similar scale to SDI to solve environmental problems, and achieve social justice and peace. This was later renamed Global Challenges Network, for which Dürr received the Right Livelihood Award, so called Alternative Nobel Prize. More recently, Dürr has contributed to the global environmental movement. He served as a member of the board of Greenpeace-Germany and as a member of the International Advisory Council on the Economic Development of Hainan in Harmony with the Natural Environment in China. In 1996, Dürr was a member of the UN Secretary General's international advisory group for the Habitat II Conference in Istanbul. Dürr is a member of the Club of Rome and serves on the scientific committee of the Vienna Internationale Akademie für Zukunftsfragen, advocating sustainable, equitable, and livable development, emphasizing energy efficiency and sufficiency as a point of entry. In 2005, he published together with Daniel Dahm and Rudolf zur Lippe the Potsdam Manifesto and the Potsdam Denkschrift as follow-up of the Russell-Einstein-Manifesto of 1955. The Potsdam Manifesto and Potsdam Denkschrift were signed by more than hundred scientists from all over the world, including 20 laureates of the Right Livelihood Award.

12.45 - 12.55 **Diskussion / Discussion**
Leitung / chaired by **Josef Mitterer** Philosophie Klagenfurt / Österreich

Josef Mitterer, born in 1948 in Westendorf, Austria, studied psychology and sociology at the universities of Innsbruck and Linz, philosophy at Graz with excursions to Heidelberg, the London School of Economics and Dubrovnik. In 1975 and 1976, he went to Berkeley to study with Paul Feyerabend. In 1978 he received his Ph.D. from the University of Graz, Austria. Deviating from both, analytical as well as continental philosophy, Mitterer had never planned an academic career and wanted to be independent in his philosophical development. Until 1990, he worked in the travel industry, first as a tour director in Europe and Asia, and eventually operating his own tours in the USA, and Europe. From 1985 – 1990, he lectured at the universities of Klagenfurt and Innsbruck at the Departments of Philosophy, Education and Economics. Since 1990, he is at the University of Klagenfurt, Austria, in the meantime as a tenured professor. In 1992, when one of his rare articles was plagiarized, he decided to publish "The Beyond of Philosophy" which had been written over ten years earlier. Mitterer's writings in the nineties were condensed into a book titled "The Flight from Arbitrariness". He is currently working on his third book "The Direction of Thinking".

Keynote
12.55 - 13.25 **GESHE LOBSANG TENZIN** Atlanta / USA

CONSCIOUSNESS IN TIBETAN BUDDHISM
BEWUSSTSEIN IM TIBETISCHEN BUDDHISMUS

Perhaps because of its elusive nature, until recently consciousness had not received serious attention from the mainstream scientific community in the west. Yet the Buddhist tradition has for millenia made consciousness the focal point of its investigations. These two contrasting treatments of consciousness may be due to the key feature of consciousness itself: that it is a subjective experience. Science attempts to understand phenomena through the methodology of third-person observation. With sophisticated technologies, such as fMRI, PET, and EEG, scientists are now attempting to explain mental phenomena through diverse models of artificial intelligence, neurophysiology, computational models, and quantum computing. The fundamental paradigm underlying this investigation is that mind and consciousness emerge from the intricate functioning of neurons and their underlying neurochemical properties. The Tibetan Buddhist tradition would concur that coarser levels of consciousness depend on neurophysiology and associated neurochemistry; however, very subtle levels of consciousness can arise independent of the brain and its functions, and are supported by much subtler levels of energy. Buddhists could hypothetically foresee a quantum computer that would be sophisticated enough to perform conscious activity, as His Holiness the Dalai Lama acknowledged in an encounter with Western scientists in 1997. Nonetheless, this computer's apparatus itself could never give rise to new conscious experience by itself, for Buddhists maintain that consciousness must have a preceding experience as its substantial cause. In other words, consciousness cannot emerge from matter alone. This presentation will elaborate on how consciousness, its nature, and its functions are understood in Tibetan Buddhism, and the radically different paradigm it presents on the origin and sufficient causes for consciousness.

Vielleicht aufgrund seiner schwer fassbaren Natur wurde dem Bewusstsein bis vor kurzem von der wissenschaftlichen Mainstream-Community im Westen keine ernsthafte Aufmerksamkeit geschenkt. Die buddhistische Tradition jedoch macht das Bewusstsein seit Jahrtausenden zum Hauptgegenstand seiner

Untersuchungen. Diese beiden unterschiedlichen Interessensansätze haben ihren Ursprung vielleicht im eigentlichen Schlüsselmerkmal des Bewusstseins: Es handelt sich um eine subjektive Erfahrung. Die Wissenschaft versucht die Phänomene mittels der Methode der Beobachtung in der dritten Person zu verstehen. Die Erklärung mentaler Phänomene gehen Wissenschaftler heute mit hochentwickelten Technologien wie fMRI, PET und EEG an und anhand diverser Modelle/Ansätze der Künstlichen Intelligenz, der Neurophysiologie, der Simulation und des Quantum Computing. Das fundamentale Paradigma, auf dem diese Ansätze basieren, ist, dass Geist und Bewusstsein aus einer schwer fassbaren Funktionsweise der Neuronen und den ihnen zugrundliegenden neurochemischen Eigenschaften emergieren. Die Tibetisch-Buddhistische Tradition stimmt mit dieser Vorstellung insofern überein, als gröbere Bewusstseinsebenen von der Neurophysiologie und der mit ihr in Verbindung stehenden Neurochemie abhängen. Sehr feine Ebenen des Bewusstseins können jedoch unabhängig vom Gehirn und seinen Funktionen entstehen und werden von viel subtileren Energieebenen unterstützt. Aus buddhistischer Sicht lässt sich rein hypothetisch ein genügend entwickelter Quantencomputer vorhersehen, der eine bewusste Aktivität zeigt wie seine Heiligkeit der Dalai anlässlich einer Begegnung mit westlichen Wissenschaftlern im Jahr 1997 erwog. Ein solcher Computer würde jedoch nie eine neue bewusste Erfahrung ermöglichen, da aus buddhistischer Sicht dem Bewusstsein eine Erfahrung als substantielle Ursache vorangeht. Anders ausgedrückt: Bewusstsein kann nicht aus Materie allein entstehen. Mein Vortrag gründet auf dem Verständnis von Bewusstsein, seiner Natur und seinen Funktionsweisen aus tibetisch-buddhistischer Sicht; und ich stelle ein grundsätzlich verschiedenes Paradigma für das Verständnis seines Ursprungs und der hierzu genügenden Ursachen vor.

Geshe Lobsang Tenzin is one of few individuals who have achieved the highest academic distinctions in both the Tibetan and the Western worlds. He was born in Kinnaur, a small Himalayan kingdom adjoining Tibet. He received his training at the Institute of Buddhist Dialectics, a school established by His Holiness the Dalai Lama, and at Drepung Loseling Monastery in south India, where in 1994 he received his Geshe Lharampa degree, the highest degree of learning in Tibetan Buddhism. In 1999 Geshe Lobsang completed his Ph.D. at Emory University; his interdisciplinary dissertation centered on traditional Buddhist and contemporary Western approaches to emotions and their impact on wellness. Geshe Lobsang has represented Tibetan Buddhism at numerous interfaith forums and conferences, including the Gethsemani Encounter, an historic Buddhist-Christian dialogue. He has lectured on Tibetan Buddhist philosophy, psychology, meditation and the mind-body connection in universities and institutions around the world. He has also served as expert commentator on Tibetan Buddhist art and culture on various events including two of the Smithsonian Institution's summer exhibits: "Tibetan Culture: Beyond the Land of Snows" and "The Silk Road: Connecting Cultures, Creating Trust". Geshe Lobsang is the founder and spiritual director of Drepung Loseling Monastery, Inc. in Atlanta, Georgia, USA, which serves as the North American seat of Drepung Loseling Monastery. He was instrumental in establishing the historic affiliation between Emory University and Drepung Loseling Monastery that was inaugurated by His Holiness the Dalai Lama in 1998. He is also a senior lecturer at Emory University, where he teaches courses on Buddhism and co-directs an on-going research study on the effects of compassion meditation for alleviating depressive symptoms and stress among undergraduate students.

13.25 - 13.35 **Diskussion / Discussion**
Leitung / chaired by Christian Thomas Kohl Buddhismus und Philosophie der Wissenschaften Freiburg i. B. / Deutschland

13.35 - 14.00 **Pause / Break**

Intervention

14.00 - 14.45 **CHRISTIAN THOMAS KOHL** Buddhismus und Philosophie der Wissenschaften Freiburg i. B. / Deutschland

BUDDHISMUS UND QUANTENPHYSIK – BUDDHISM AND QUANTUM PHYSICS

"Die nichtlokale Verschränkung ist eine sonderbare Angelegenheit. Es handelt sich um einen Mischzustand – die Objekte sind weder richtig getrennt, noch richtig miteinander verbunden –, der ein rein quantenmechanisches Phänomen ist und in der klassischen Physik kein Analogon besitzt". (Roger Penrose)
Wenn wir verstehen wollen, welche Wechselwirkungen das Bewusstsein mit dem Gehirn verschränken, sollten wir uns mit den metaphysischen Prinzipien beschäftigen, die den Dingen zugrundeliegen. Der buddhistische Philosoph Nagarjuna hielt Zwei-Körper-Systeme für grundlegend: Ding und seine Bedingungen, Geher und begangene Strecke, Seher und Sehen, Ursache und Wirkung, Tat und Täter, Feuer und Brennstoff. Die beiden Körper solcher Zwei-Körper-Systeme sind nicht eins, aber sie fallen auch nicht in unabhängige Körper auseinander. Die fundamentale Wirklichkeit besteht nicht aus einzelnen, unabhängigen Dingen, sondern aus Phänomenen, die gegenseitig voneinander abhängig sind. Das eine Ding entsteht nicht aus dem anderen. – Der quantenphysikalische Wirklichkeitsbegriff kann durch drei Schlüsselbegriffe dargestellt werden: Komplementarität, Wechselwirkungen und Verschränkungen. Auch in der Quantenphysik sind Zwei-Körper-Systeme grundlegend: Erde und Mond, Proton und Elektron, Welle und Messgerät, Teilchen und Messgerät, verschränkte Zwillingsphotonen. Diese Quantenobjekte lassen sich nicht auf zwei getrennte, unabhängige Körper reduzieren. Sie sind

durch gegenseitige Abhängigkeiten ihrer Bestandteile gekennzeichnet. Quantenobjekte existieren nicht unabhängig von einander und vom Messgerät.
Beiden Modellen liegt das Prinzip der gegenseitigen Abhängigkeit zugrunde. Beide Modelle beschreiben Zwei-Körper-Systeme, deren Körper weder richtig getrennt, noch richtig miteinander verbunden sind, weder fallen sie zusammen, noch auseinander. Diese grundlegenden Zwei-Körper-Systeme haben eine fragile Stabilität, die auf manchmal bekannten, manchmal noch nicht vollständig bekannten und manchmal auf vollkommen unbekannten Wechselwirkungen und gegenseitigen Abhängigkeiten ihrer Komponenten beruht. Verschränkte Zwillingsphotonen und Bewusstsein und Gehirn sind zwei Beispiele für vollständig unbekannte Wechselwirkungen.

"Nonlocal entanglement is a very strange type of thing. It is somewhere between objects being separate and being in communication with each other - it is a purely quantum mechanical phenomenon and there is no analogue of this in classical physics". (Roger Penrose)
If we want to understand how consciousness and the brain are entangled, we ought to occupy ourselves with the metaphysical principles underlying things. The Buddhist philosopher Nagarjuna considered two-body systems as basic: things and conditions, goer and walked distance, seer and see, cause and effect, deed and doer, fire and fuel. The two bodies of such two-body systems are neither one, nor do they fall apart into independent bodies. The fundamental reality does not consist of single, independent things but of phenomena which are mutually dependent on each other. One thing does not emerge from the other. – The quantum-physical concept of reality can be represented by three key concepts: complementarity, weak and strong forces and entanglements. In quantum physics two-body systems are basic, too: earth and moon, proton and electron, wave and measurement apparatus, particle and measurement apparatus, entangled twin photons. These quantum objects are not to be reduced to two segregated and independent bodies. They are characterized by the mutual dependence of their compounds. Quantum objects do not exist independently from one another and from the measurement apparatus. Both models are based on the principle of mutual dependence. Both models describe two-body systems whose bodies are neither properly separated, nor properly connected to each other, they neither belong together, nor do they fall apart. These basic two-body systems have a fragile stability which is sometimes based on a known, sometimes not yet entirely known, and sometimes totally unknown interdependence of their components. Entangled twin photons, and consciousness and the brain, are two examples for a completely unknown interdependence/interrelationship.

Christian Thomas Kohl received his degree in Political Sciences at the Freie Universität Berlin. He studied music and works as a teacher of history and languages in Freiburg i.B.. In 1980, Kohl became interested in Buddhism and the metaphysical foundations of quantum physics. He has been dedicating a major part of his time during the past two decades on the "reconciliation" of the fundamental concepts of quantum physics and those in Buddhist philosophy. Kohl is a member of the Sakya tradition of Tibetan Buddhism. In 2005 he published his new book "Buddhismus und Quantenphysik – Die Wirklichkeitsbegriffe Nagarjunas und der Quantenphysik".

Leitung / chaired by **Christina Ljungberg** Kulturwissenschaften und Semiotik Zürich / Schweiz

Christina Ljungberg studied first at Lund University and later at the University of Zurich, where she received her Ph.D. in 1998. She has worked in Cultural Programming with Swedish and Canadian Television and has been teaching English literature at the University of Zurich since 1995. She has published widely on cognitive and visual semiotics and is currently working on a book on diagrams in visual and verbal narratives. Her major publications include her books To Join, to Fit and to Make (1999), The Crisis of Representation (in collab. 2003), her essays "Cartography and Fiction" (2003), "Meeting the Cultural Other: Semiotic Approaches to Intercultural Communication" (2003), "Between Reality and Representation: The diagrammatic function of photographs and maps in fiction" (2004), "Diagrams and Diagrammatization in Literary Texts" (2005), "Maps Mapping Minds" (2005), "Mapping the Territories of Being" (2006), "Cognition and Interpretation" (2006) and most recently her book Insistent Images (in collab. 2007).

14.45 - 15.00 **Pause / Break**

Keynote
15.00 - 15.30 **DEAN RADIN** Bewusstseinsforschung Petaluma / USA

ENTANGLED MINDS: CONTEXT, EVIDENCE, AND THE FUTURE
VERSCHRÄNKTE MINDS: KONTEXT, BEWEISE UND ZUKUNFT

Everyday experience of the world presents us with an array of independent objects, separated in space and time. From this common sense perspective we develop mechanistic models of the world that involve concepts like causality, force, and a stable reality that persists whether or not we are looking at it. This classical reality is learned early in life, it is reinforced by Western education and society, and it is taken for granted by most adults as self-evident unless something comes along that forces one to question it.

One such challenge has been the development of quantum mechanics, which has seriously questioned the basic assumptions underlying classical reality. Another challenge are commonly reported anomalies associated with human consciousness, experiences collectively known as "psychic phenomena". This presentation considers the possibility that psychic phenomena and quantum concepts are deeply related. To examine this proposal beyond superficial similarities, I will discuss repeatable scientific experiments suggesting that some commonly reported psychic phenomena are what they appear to be, I will propose that reframing psychic phenomena from classical into quantum concepts helps explain why these phenomena ought to exist, and I will speculate how the disciplines of quantum computing and quantum information processing are developing concepts that, in the future, may be able to satisfactorily explain psychic phenomena in rational, scientific terms.

Die alltägliche Welterfahrung präsentiert uns eine Reihe von unabhängigen Objekten, die in Raum und Zeit getrennt sind. Aus dieser Perspektive des "Common Sense" entwickeln wir mechanistische Modelle der Welt, Konzepte wie Kausalität und Kraft voraussetzen und stabile Realität, die besteht, ob wir hinschauen oder nicht. Mit dieser klassischen Realität lernen wir schon in jungen Jahren umzugehen, die westliche Lebensart, Bildung und Gesellschaft bestärken sie und die meisten Erwachsenen nehmen sie als gegeben und offenkundig an, falls sich ihnen nicht etwas in den Weg stellt, das sie zur Hinterfragung zwingt. Eine solche Herausforderung ist die Entwicklung der Quantenmechanik, die die grundsätzlichen, der klassischen Realität zugrundeliegenden Annahmen ernsthaft in Frage gestellt hat. Eine andere Herausforderung sind Anomalien, von denen gemeinhin berichtet wird und die mit dem menschlichen Bewusstsein verbunden sind – Erfahrungen, die allgemein als "psychische Phänomene" bekannt sind. Der Vortrag zieht die Möglichkeit in Betracht, dass psychische Phänomene und die Konzepte der Quantenwelt in einer tiefen Beziehung zueinander stehen. Um diesen Vorschlag jenseits oberflächlicher Ähnlichkeiten zu untersuchen, diskutiere ich wiederholbare wissenschaftliche Experimente, die nahe legen, dass einige psychische Phänomene, von denen allgemein berichtet wird, das sind, was sie zu sein scheinen. Die von mir vorgeschlagene Neubetrachtung der psychischen Phänomene in Quantenkonzepten könnte erklären helfen, warum die Existenz dieser Phänomene angenommen wird. Ich werde darüber spekulieren, wie die Disziplinen des Quantum Computing und die Prozessierung von Quanteninformation sich in Entwicklung befindende Konzepte sind, mit denen psychische Phänomene in der Zukunft vielleicht einmal rational und wissenschaftlich befriedigend erklärt werden können.

Dean Radin received his first degree in electrical engineering, magna cum laude, with honors in physics and a minor in music performance from the University of Massachusetts, and then a Masters degree in electrical engineering and Ph.D. in psychology from the University of Illinois, Champaign-Urbana. For a decade following graduate school he worked at AT&T Bell Laboratories and GTE Laboratories, where he conducted basic and applied research on human-computer interaction. For the past two decades he has investigated extended capacities of human consciousness at Princeton University, University of Edinburgh, University of Nevada, and SRI International, where he worked on a program investigating psychic phenomena for various US government agencies. Since 2001 he has been a senior scientist at the Institute of Noetic Sciences. Radin has published over 200 scientific, technical and popular articles on topics ranging from psychology to physics, and is author of "The Conscious Universe" (1997, HarperCollins) and "Entangled Minds" (2006, Simon and Schuster). Recent journal articles include "Double-blind test of the effects of distant intention on water crystal formation" in: Explore: The Journal of Science and Healing, "The sense of being stared at: A preliminary meta-analysis" in the Journal of Consciousness Studies, and with three coauthors "Correlation of continuous random data with major world events" in Foundations of Physics Letters.

15.30 - 15.40 Diskussion / Discussion
Leitung / chaired by Wolfgang Tschacher Psychologie Bern / Schweiz

Wolfgang Tschacher, born 1956 in Germany, studied psychology at University of Tübingen where he received his Ph.D. in 1990. Psychotherapy training in systemic therapy at the Institute of Family Therapy, Munich. Habilitation in psychology and Venia legendi 1996 at University of Berne, Switzerland, professorship in 2002. He works at the University Hospital of Psychiatry and is currently head of the department of psychotherapy. His main interests are in empirical psychotherapy research and experimental psychopathology, with an emphasis on dynamical systems approaches and phenomena of cognitive self-organization. For a list of references and project information see www.upd.unibe.ch. Wolfgang Tschacher has three adolescent sons and lives in Berne.

Keynote
15.40 - 16.10 COURTNEY BROWN Mathematik und Hellsehen Atlanta / USA

REMOTE VIEWING, NONLOCAL CONSCIOUSNESS, AND THE NATURE OF TIME AND SPACE
HELLSEHEN, NICHTLOKALES BEWUSSTSEIN UND DIE NATUR VON ZEIT UND RAUM

Recent breakthroughs in the study of nonlocal consciousness using structured remote-viewing processes now unambiguously indicate that perception can extend beyond the local five physical senses of hearing, touch, sight, taste, and smell. That is, it is now clear that the brain can receive large quantities of perceptual information from nonlocal sources that are not physically connected to the five senses. It is

now possible to conduct fully replicable experiments using exhaustive scientific controls that demonstrate this conclusively. Data collection procedures are now robust, faulty old experimental designs are now well-understood, new experimental designs can now provide profound and fully replicable results, and specialized statistical software is now available that can accurately evaluate the nonlocal perceptual data. Nonlocal perception also works transparently through time. The implications to our understanding of time and space are profound. If the human brain is a computational device, then it could operate as a quantum computer that utilizes nonlocal quantum properties since information can be transferred in a manner that violates the limitations imposed on the transfer of information (or anything else) by relativity theory. New cosmological ideas are required that extend well beyond the currently debated theories of time and space in order to account for these experimental results. I discuss these results involving nonphysical perception within the context of a variety of quantum and relativistic theories of physical reality, and I suggest aspects of these theories that would need modification in order to better incorporate these experimental results.

Kürzliche Durchbrüche bei Untersuchungen von nichtlokalem Bewusstsein, das anhand von strukturierten Prozessen des Remote Viewing (Clairvoyance) operationalisiert wurde, weisen unzweideutig darauf hin, dass Wahrnehmung über die lokalen fünf physischen Sinne des Hörens, Berührens, Sehens, Schmeckens und Riechens hinausreichen kann. Daraus lässt sich schliessen, dass das Gehirn grosse Mengen von nicht-perzeptueller Information aus nicht-lokalen Quellen empfangen kann, die physisch nicht mit den fünf Sinnen verbunden sind. Es ist heute möglich, unter Einsatz von umfassenden wissenschaftlichen Kontrollen vollständig wiederholbare Experimente auszuführen die diesen Schluss zulassen. Die Datenerwerbsverfahren sind heute solid, die früher fehlerhaften experimentellen Anordnungen werden nun gut verstanden, die neuen experimentellen Designs stellen tiefgreifende und vollständig replizierbare Ergebnisse zur Verfügung. Die heute im Einsatz stehende spezialisierte statistische Software kann die nichtlokalen Wahrnehmungsdaten genau evaluieren. Auch funktioniert die nicht-lokale Wahrnehmung auf transparente Weise in der Zeit. Für unser Verständnis von Zeit und Raum sind diese Implikationen nachhaltig. Falls es sich beim menschlichen Gehirn um einen Rechner handelt, dann könnte es wie ein Quantencomputer funktionieren, der nicht-lokale Quanteneigenschaften benützt, da dabei Information auf eine Art transferiert werden könnte, die die durch die Einschränkungen der Relativitätstheorie dem Transfer von Information (oder irgend etwas anderem) gesetzten Grenzen verletzt. Neue kosmologische Ideen sind notwendig, die über die heute debattierten Theorien von Zeit und Raum hinausreichen, damit experimentell gewonnene Ergebnisse miteinbezogen werden können. Ich diskutiere die nicht-lokale Wahrnehmungen involvierenden Resultate im Kontext verschiedener Quanten- und relativistischer Theorien der physischen Realität und schlage Aspekte dieser Theorien zur Modifikation vor, die die experimentellen Ergebnisse besser berücksichtigen.

Courtney Brown received his Ph.D. degree from Washington University (St. Louis) in 1981 in political science with an emphasis on mathematical modeling. He began his teaching career as a college calculus instructor in Africa before moving on to teach nonlinear differential and difference equation modeling in the social sciences at the University of California at Los Angeles, Emory University, and the Inter-University Consortium for Political and Social Research Summer Program at the University of Michigan. Independent of his work as a college professor, he is the Director and founder of "The Farsight Institute" (www.farsight.org), a nonprofit research and educational organization dedicated to the study of the phenomenon of nonlocal consciousness known as "remote viewing". He recently published a book titled "Remote Viewing: The Science and Theory of Nonphysical Perception". In this book he analyzes data and develops a new theory that explains the remote-viewing.

16.10 - 16.20 **Diskussion / Discussion**
Leitung / chaired by **Dean Radin** Bewusstseinsforschung Petaluma / USA

16.20 - 16.45 **Pause / Break**

16.45 - 18.00

DO BRAINS MAKE MINDS?

Podiumsgespräch und Diskussion 2. Tag / Panel Discussion 2nd Day

mit / with **COURTNEY BROWN, HANS-PETER DÜRR, CHRISTINA LJUNGBERG, CHRISTIAN THOMAS KOHL, JOSEF MITTERER, DEAN RADIN, GESHE LOBSANG TENZIN, WOLFGANG TSCHACHER**

Leitung / chaired by **Peter Weibel** Kunst- und Medientheorie Karlsruhe

René Stettler, born in 1955, is a cultural researcher with many years of international experience. In 2003 he won an award for his intercultural projects from the City and the Canton of Lucerne and in the same year he was also awarded the Swiss Art Award. Stettler is the founder and director of the New Gallery Lucerne, and the Swiss Biennial on Science, Technics + Aesthetics, Lucerne. The New Gallery Lucerne is an institution which is supported by the Swiss Federal Office of Culture and local cultural institutions of the Canton and the City of Lucerne. In 1995, Stettler started organizing the former Lucerne "Symposium of Science, Technics + Aesthetics". Today, the Swiss Biennial on Science, Technics + Aesthetics is based on the idea of fostering science-theoretically-, epistemologically- and philosophically-oriented discourses at the interface of quantum physics and consciousness research. The goal of these lectures, talks and discussions has been to provide a better comprehension of physical realities including critical, epistemological positions and debates contributing to the relation of knowledge and reality, science and rationality, language and understanding, cognition and society. The Biennial attracts an international audience from Switzerland, Europe and America. Its focal points are academic debates between scientists, artists and theoreticians from different knowledge backgrounds in order to foster dispute and discussion. A major goal is to improve public understanding of physical micro world phenomena, which are difficult to comprehend even in intuitive terms. Another important intent is to position new productive discourses in a social environment which means to examine them critically *in situ*. Former Swiss Biennal Conferences were Brain-Mind-Culture (1995), Liquid Visions (1997), Frontier Communication: Human Beings, Apes, Whales, Electronic Networks (1999), The Enigma of Consciousness (2001), Consciousness and Teleportation (2005).
René Stettler is an independent scholar and lecturer at the Hochschule für Gestaltung und Kunst in Lucerne, Switzerland where he teaches media art and -theory, culture management, and a seminar about the late Czech philosopher and media theorist Vilém Flusser. He is a member of Prof. Roy Ascott's Planetary Collegium at the University of Plymouth / UK. In his doctoral research Stettler investigates the field of interdisciplinary cultural intermediation of knowledge which has been his working environment in the past 20 years in order to make it comprehensible from a culturally-critical and analytical viewpoint. The aim is to open up the field for a profound theoretical and conceptional scrutiny. For Stettler, the research project is also a challenge, a kind of "reformulation" of his own personal and social commitment to create conditions for creativity – conditions that are substantial prerequisites for cultural responsibility. He has been specifically motivated by the fact that these connections are not made available by our universities which, due to specialization, do not seem to strive for such knowledge, nor for the various ways it articulates our human capacities for interconnecting, which constitutes consciousness.

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