SFB Meeting July 12th-13th 2012

Thursday, July 12th

14:00	20+5	14:25	Schmiedmayer group	T. Berrada	*Mach Zehnder Interferometer with trapped atoms*
14:25	20+5	14:50	Zoller group	H. Pichler	*Measuring entanglement entropies in atomic quench dynamics: a proposal and case study*
14:50	50	15:40	Poster session and coffee break		
15:40	40+10	16:30	Invited talk	A. Buchleitner, U. Freiburg	*(Quantum) complexity in biological tissue - why could coherence matter?*
16:30	20+5	16:55	Blatt group	P. Schindler	*Quantum simulation of open and closed systems*
16:55	20+5	17:20	Baranov group	C. Kraus	*Preparing, Probing and Manipulating atomic Majorana Fermions in Optical Lattices*
18:00			Bus to Hungerburg, and then walk to Arzler Alm		
19:00			Dinner at Arzler Alm		
?			Bus back		

Friday, July 13th

08:30	60	09:30	SFB-business meeting (bosses only)		
09:30	20+5	09:55	Ritsch group	C. Genes	*Strong coupling of light to collective motional modes of an array of scatterers*
09:55	20+5	10:20	Zeilinger group	B. Wittmann	*Loophole-free Einstein-Podolsky-Rosen experiment via quantum steering*
10:20	30	10:50	Coffee break		
10:50	40+10	11:40	Invited talk	S. Andergassen, U. Vienna	*Quantum many-body effects in transport through quantum dots and wires*
11:40	20+5	12:05	Weihs group	H. Jayakumar	*Deterministic cascaded photon pairs from an InAs quantum dot via resonant two-photon excitation*
12:05	20+5	12:30	Guest talk	P. Pham, U. Washington	*Adventures in quantum architecture: 2D circuits, factoring, and quantum compilers*

trains to Vienna	14:09	RJ 165
	15:06	OIC 869
	16:09	RJ 567

Abstracts for invited talks

(Quantum) complexity in biological tissue - why could coherence matter?
A. Buchleitner, U. Freiburg
New spectroscopic data from biochemistry suggest that evolution might employ quantum coherence effects to steer relevant performances in energy transduction. The issue is still widely open, but this makes it also *very* intriguing and interesting, in particular since the systems under scrutiny are "dirty" in the best sense, and have everything most quantum opticians are educated to DISlike: disorder, noise, interactions. I will try to describe the basic phenomenology, and adopt a statistical point of view, to address the possible role of quantum coherence effects for robust "bio-design".

Quantum many-body effects in transport through quantum dots and wires
S. Andergassen, U. Vienna
The understanding of correlation effects and their impact on the quantum coherence is of fundamental importance in view of technological implementations of quantum computing schemes and nanoelectronic applications. Using recently developed renormalization-group approaches, we investigate the effect of Coulomb interactions in quantum dots and wires and their characteristic signatures in the spectral and transport properties. We provide examples for the rich many-body physics of simple model systems in and out of equilibrium, as well as challenging extensions to more complex systems as realized in experiments.

Adventures in quantum architecture: 2D circuits, factoring, and quantum compilers
P. Pham, U. Washington
Quantum compiling maps the high-level, multi-qubit gates of quantum algorithms to the physical layout of a realistic quantum architecture, usually in two dimensions, with nearest-neighbor interactions, consisting of single- and two-qubit gates. It represents an intermediate engineering layer, inspired by classical computer programming, between mathematical theory and physical experiment. I will present recent progress in constructing quantum circuits on a 2D architecture, which can be used to implement Shor's factoring algorithm in depth polylogarithmic in the size of the input. I will also discuss its connection to quantum compiling algorithms, and broader implications for future research, both theoretical and experimental.