



SFB/Transregio 21

2nd International Summerschool 2009

September, 22nd – 24th 2009
Heinrich-Fabri-Institut, Blaubeuren

Topics:

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|-------------------|---|
| 22.09.2009 | Semiconductors
(Chair: J. Wrachtrup, F. Jelezko) |
| 23.09.2009 | Ultracold atoms and molecules
(Chair: R. Kleiner, F. Schmidt-Kaler) |
| 24.09.2009 | Molecular magnets and spins
(Chair: M. Dressel, M. Scheffler) |

Program

TA	= Talk
TU	= Tutorial with discussion

Tuesday, 22.09.2009

Semiconductors (Chair: J. Wrachtrup, F. Jelezko)

From 11:30 Arrival

12:30 – 14:00 Lunch

14:00 – 15:30 D. Yakovlev (TU Dortmund) TU
"Optical control of electron spin coherence in quantum dots"

15:45 – 16:30 P. Michler (Universität Stuttgart) TA
"Semiconductor Quantum Optics"

16:30 – 17:00 Coffee Break

17:00 – 17:45 F. Jelezko (Universität Stuttgart) TA
"Detecting single spins in diamond: from solid state quantum registers to applications"

17:45 – 18:30 **Co.Co.Mat Award 2008:** TA
M. Kemmler (Universität Tübingen)
"Manipulation and Control of Flux Quanta in Superconductors by Tailored Pinning Sites"

18:30 Dinner

20:00 M. Stoneham (Department of Physics and Astronomy, University College London) TA
"The Quantum in Your World"

Wednesday, 23.09.2009

Ultracold atoms and molecules (Chair: R. Kleiner, F. Schmidt-Kaler)

From 7:30 Breakfast

9:00 – 10:30 A. Browaeys (Institut d'Optique, Palaiseau) TU
"Single atoms in optical tweezers for quantum information"

10:45 – 12:15 C. Zimmermann (Universität Tübingen) TU
"The matter wave magic: Bose-Einstein condensates and other accumulations of trapped cold atoms"

12:30 – 14:00 Lunch

14:00 – 15:30	J. Hecker-Denschlag (Universität Ulm) <i>"Cold collisions of atoms"</i>	TU
15:45 – 16:30	C. Zimmermann (Universität Tübingen) <i>"Bragg-Spectroscopy of Fermions"</i>	TA
16:30 – 17:00	Coffee break	
17:00 – 17:45	A. Browaeys (Institut d'Optique, Palaiseau) <i>"Entanglement of two atoms using the Rydberg Blockade"</i>	TA
17:45 – 18:30	J. Hecker-Denschlag (Universität Ulm) <i>"Formation of ultracold molecules"</i>	TA
18:30	Dinner	
19:30	Excursion to the nearby Reissenschloß and stone-age cave	

Thursday, 24.09.2009

Molecular magnets and spins (Chair: M. Dressel, M. Scheffler)

From 7:30	Breakfast	
9:00 – 10:30	L. Bogani (Universität Stuttgart) <i>"Quantum Computation with Molecular Magnets"</i>	TA
10:45 – 12:00	M. Mehring (Universität Stuttgart) <i>"Basics of Quantum Computing"</i>	TU
12:30 – 14:00	Lunch	
14:00 – 15:15	M. Mehring (Universität Stuttgart) <i>"Quantum Computing with Spins"</i>	TU
15:15 – 16:15	A. Cornia (Università degli Studi di Modena e Reggio Emilia) <i>"Molecular magnets from a chemist view"</i>	TU
16:15 – 17:00	Coffee break	
From 17:00	Departure	



**2nd International Summer School
of the SFB/TRR21
"Control of Quantum Correlations in Tailored Matter"
Heinrich-Fabri-Haus, Blaubeuren
September 22.-24. 2009**

Tuesday, 22.9.: Semiconductors (Chair: J. Wrachtrup, F. Jelezko)

Speakers:

D. Yakovlev, Dortmund
P. Michler et al., Stuttgart
F. Jelezko, Stuttgart

Topics:

The session deals with the spin physics of semiconductors as well as the spin photon and photon exciton interaction in semiconductor nanostructures. Engineering the light matter interaction by photonic structures as well as coupling among semiconductor nanostructures will be discussed. Materials comprise defects in diamond as well as quantum wells and quantum dots.

Wednesday, 23.9.: Ultracold atoms and molecules (Chair: R. Kleiner, F. Schmidt-Kaler)

Speakers:

Antoine Browaeys, Paris
Johannes Hecker-Denschlag, Ulm
Claus Zimmermann, Tübingen

Topics:

The session includes tutorials on: Trapping of single atoms, single interacting Rydberg atoms, formation of molecules from atoms in lattices, spectroscopy of molecules and its applications, and a selection from the following issues: Bose-Einstein condensate and atomic quantum gas, optical lattice and energy bands, Mott insulator and Bose-Hubbard model, double well potential and number squeezing with cold atoms, Bragg and Ramsey spectroscopy with cold atoms

Thursday 24.9.: Molecular magnets and spins (Chair: M. Dressel, M. Scheffler)

Speakers:

Andrea Cornia, Modena
Michael Mehring, Stuttgart
Lapo Bogani, Stuttgart

Topics:

We discuss molecular magnets from a chemist view, basics of quantum computing, quantum computing with spins, quantum computation with molecular magnets

Overview:

Tu 22. 9.	Speaker	Wed, 23. 9.	Speaker	Thu, 24. 9.	Speaker
	<i>Arrival</i>	9:00-10:30	Antoine Browaeys (Tutorial)	9:00-10:30	Lapo Bogani, <i>Quantum Computation with Molecular Magnets</i>
			<i>Discussion</i>		<i>Discussion</i>
		10:45-12:15	Claus Zimmermann (Tutorial)		10:45-12:00
			<i>Discussion</i>		<i>Discussion</i>
12:30-14:00	<i>Lunch</i>		<i>Lunch</i>		<i>Lunch</i>
14:00-15:30	Dmitri Yakovlev	14:00-15:30	Johannes Hecker-Denschlag (Tutorial)	14:00-15:15	Michael Mehring <i>Quantum Computing with Spins</i>
	<i>Discussion</i>		<i>Diskussion</i>		<i>Diskussion</i>
15:45-16:30	Peter Michler	15:45-16:30	Claus Zimmermann	15:15-16:15	Andrea Cornia (Tutorial) <i>Molecular magnets from a chemist view</i>
16:30-17:00	<i>Coffee Break</i>	16:30-17:00	<i>Coffee Break</i>	16:15	<i>Coffee break</i>
17:00-17:45	Fedor Jelezko	17:00-17:45	Antoine Browaeys		<i>Departure</i>
17:45-18:30	Matthias Kemmler	17:45-18:30	Johannes Hecker-Denschlag		
18:30	<i>Dinner</i>	18:30	<i>Dinner</i>		
20:00	Marshall Stoneham (Evening Lecture)	19:30	Excursion to the nearby Reissenschloß and stone-age cave		