

**THE TAMU-CASPER COLLEGE SUMMER SCHOOL
ON QUANTUM SCIENCE AND ENGINEERING**

Casper, Wyoming

July 18-31, 2010

WEEK 2

Monday, July 26 *Morning Chair: Marlan Scully*

8:15-8:30	Bowen Loftin	Welcome
8:30-10:00	Dudley Herschbach *	Dimensional Scaling: Tutorial Overview
10:00-10:30	BREAK	
10:30-11:15	Anatoly Svidzinsky *	Bohr Model and D-scaling Analysis of Atoms & Molecules
11:15-12:00	Goong Chen *	Dimensional Scaling for the Schoedinger Eq'n with a Power-Law Potential
12:00	LUNCH	

Evening Chair: Dudley Herschbach

7:00- 7:30	Marlan Scully	Quantum Weirdness: Fundamentals and Applications
7:30-8:30	Alexei Sokolov	Molecular Orientation with Short Pulses
8:30-8:50	BREAK	
8:50-9:20	Tamar Seideman	Information Content of High Harmonics Generated from Aligned Molecule
9:20-9:50	Manfred Kleber	1/N expansion: A road to phase transitions
9:50-10:00	Xiwen Zhang	Quantum Information in the Solid State

* Part of Workshop on Unorthodox Theoretical Methods for Chemical Physics

Tuesday, July 27 *Morning Chair: Tamar Seideman*

8:30-10:00 David Mazziotti * Reduced Density Matrix Mechanics for Many-Electron Atoms & Molecules

10:00-10:30 BREAK

10:30-11:15 Sabre Kais * Quantum Information for Quantum Chemistry

11:15-12:00 Deborah Watson * Rearranging the Exponential Wall

12:00 LUNCH

Evening Chair: David Mazziotti

7:00-8:00 Federico Capasso Quantum Cascade Lasers: Coherent Instabilities, Mode-Locking and New Resonator Dynamics

8:00- 8:30 Dong Hee Son Dynamics of Energy Relaxation and Energy Transfer in Nanocrystals

8:30-8:50 BREAK

8:50-9:20 Thomas Becker Cavity QED in the Microwave Regime: A Review on Micromaser Experiments

9:20-9:50 Weng Chow Quantum Optics of a Quantum Dot Strongly Coupled to Optical-Cavity Mode and Phonon Bath

9:50-10:00 Zhenshan Yang Mechanism for Modulation Response Enhancement in Injection-Locked Semiconductor Lasers

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Wednesday, July 28 *Morning Chair: Szymon Suckewer*

8:30-10:00	Garnet Chan *	Quantum Renormalization Groups and Fermionic Tensor Networks
10:00-10:30	BREAK	
10:30-11:15	Sabre Kais *	Finite Size Scaling & Quantum Criticality at the Large-D Limit and $D = 3$
11:15-12:00	Leon Cohen *	Local Values and Local Uncertainty Principles in Quantum Mechanics
12:00	LUNCH	

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Thursday, July 29 *Morning Chair: Sabre Kais*

8:30-9:15	Qi Wei *	Large-D Limit for Atoms & Molecules in Superintense Laser Fields
9:15-10:00	Alexey Sergeev *	Generalizations of Bohr Model and D-scaling Method
10:00-10:30	BREAK	
10:30-12:00	Cattle-Rustling Session * (led by Sabre Kais)	Open Problems & Prospects for Linking D-scaling with other Methods
12:00	LUNCH	

Evening Chair: Garnet Chan

7:00- 7:30	Steven Wheeler	High-Accuracy Ab Initio Thermochemistry of Organic Molecules
7:30-8:00	Christian Hilty	Hyperpolarized NMR
8:00-8:30	Vaclav Spicka	Fast Dynamics of Mesoscopic Systems: Nonequilibrium Green's Functions Approach
8:30-8:50	BREAK	
8:50-9:10	Peter Keefe	The Second Law of Thermodynamics and Quantum Heat Engines: Is the Law Strictly Enforced?
9:10-9:30	Laith Haddad	The Nonlinear Dirac Equation in Bose-Einstein Condensates: Relativistic Linear Stability Equations, Nonlinear Localized Modes, and Cherenkov Radiation

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Friday, July 30 *Morning Chair: Leon Cohen*

8:30-9:00	Kim Chapin and Konstantin Dorfman	Introduction to Solar Cell Physics
9:00-9:30	Konstantin Dorfman	Solar Cells and Detailed Balance
9:30-10:30	Kevin Lehmann	Modeling Sensitivity Limits in Cavity Ring-Down and Cavity Enhanced Absorption Spectroscopies
10:30-11:00	BREAK	
11:00-11:30	Robert Brick	H1N1 Vaccine from Tobacco Plants
11:30-12:00	Vincenzo Tamma	Optical realization of a novel factorization algorithm
12:00	LUNCH	

Evening Chair: Marlan Scully

7:00- 9:30 Continuation of Cattle-Rustling Session*

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