

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

Casper, Wyoming

July 18-31, 2010

WEEK 1

Monday, July 19 *Morning Chair: Daniel Marble*

8:15-8:30	Marlan Scully and Daniel Marble	Welcome
8:30-9:00	Marlan Scully	D-Scaling Intro and Lasers Without Inversion
9:00-9:30	Szymon Suckewer	Overview of Experiment and Theory on Development Recombination X-ray Lasers; XRLs in "Water Window" with and without Coherent Pumping
9:30-10:00	Yoav Avitzour	Simulating Recombination X-Ray Lasers - From Ionization to Recombination and Gain
10:00-10:30	BREAK	
10:30-10:45	Hui Xia	"Experimental Investigation of Coherence Enhanced XUV in He or He-like Ions"
10:45-11:15	Frank Narducci	Cold atoms; Magnetometry; Quantum Optics
11:15-11:45	Fabian Weise	Quantum control and photoassociation in ultracold gases
11:45-12:00	Sumanta Das	Quantum Entanglement and Ways to Protect it using Quantum Interference
12:00	LUNCH	

Evening Chair: Jaan Laane

7:00- 7:30	Alexei Sokolov	Coherent Control I (tutorial)
7:30-8:00	Dick Miles	Measurement of Electron Recombination and Attachment Rates in Atmospheric Pressure Gases by Radar REMPI "
8:00-8:15	Konstantin Dorfman	Fluctuations in Mesoscopic Weakly-Interacting Bose- Einstein Condensate
8:15-8:35	BREAK	
8:35-8:45	Ari Gombojav	Superfluorescence in Rubidium Vapor
8:45-8:55	Luqi Yuan	Controlling Pathways of Coherent Anti-Stokes Raman Scattering in Cesium Dimers
8:55-9:05	Andrew Traverso	Implementing a genetic algorithm for pulseshaping in CARS and Stand-off Superradiant Spectroscopy
9:05-9:15	Wenlong Yang	Using genetic algorithm controlled pulse shaping to optimize coherent anti-Stokes Raman scattering
9:15-9:25	Xi Wang	Coherent anti-Stokes Raman scattering (CARS) optimized by exploiting optical interference
9:25-9:35	Matt Springer	Energy Transfer Between Crossed Filaments

Tuesday, July 20 *Morning Chair: Mike Shlesinger*

8:30-9:30 Phillip Sprangle Propagation of USPLs in the Atmosphere, Filamentation and Nitrogen Lasing

9:30-10:00 Zhengdong Cheng Solar hydrogen production via water splitting

10:00-10:30 BREAK

10:30-11:00 Torsten Siebert Femtosecond Filaments (Tutorial)

11:00-11:30 Mikhail Shneider Plasma Generated and Sustained in Air by the Double Laser Pulses

11:30-12:00 Michael Duff Black holes and qubits

12:00 LUNCH

Evening Chair: Anatoly Szidzinsky

7:00- 7:30 Torsten Siebert Coherent Control II (tutorial)

7:30-8:00 Robert Lucchese Photoionization in the molecular frame

8:00-8:30 Dick Miles Parts per Billion Standoff Detection of Nitric Oxide and Other Species in Air by Radar REMPI

8:30-8:50 BREAK

8:50-9:00 Matt Springer Investigation of optical precursors in an organic dye solution

9:10-9:20 Andrii Sizhuk Application of the kinetic macroscopic theory for a strongly pumped dense gas

9:20-9:30 Xiwen Zhang “Valve” effect in fluorescence of a driven ladder system

9:30-9:40 J.P. Hadden Extracting more photons from diamond defect centres using integrated solid immersion lenses

Wednesday, July 21 *Morning Chair: Federico Capasso*

8:30-9:15	Alexei Sokolov	DNA
9:15-10:00	Duane Kraemer	Cloning Animals
10:00-10:30	BREAK	
10:30-11:15	Jaebum Choo	Highly Sensitive Biological Detection Using Nano-Probe Based Optical Sensor
11:15-12:00	Jinwu Ye	Angle Resolved Photoluminescence Spectrum from Exciton Condensate in Electron-Hole Semiconductor Bilayers
12:00	LUNCH	

5:30 PM Conference Dinner in Honor of Charles Townes

6:00 PM Special After Dinner Presentation by Dr. Charles H. Townes: “Stellar Interferometry”

Thursday, July 22 *Morning Chair: Robert Lucchese*

8:30-9:00	Torsten Siebert	Towards Nonlinear Raman Optical Activity: Chirality as an Access to the Subtleties of Structure in Biological Macromolecules
9:00-9:30	Ed Fry	Integrating Cavity Ring-down Spectroscopy
9:30-10:00	George Welch	Heterodyne CARS
10:00-10:30	BREAK	
10:30-11:00	Jaan Laane	Spectroscopic and Computational Investigations of Potential Energy Surfaces and Molecular Structures in Ground and Excited Electronic States
11:00-11:30	Szymon Suckewer	A New Type of Compact Ultraintense Femtosecond Laser via Raman Backscattering in Plasma
11:30-12:00	Alexander Sinyukov	Gold nanoparticles for Surface Enhanced CARS
12:00	LUNCH	

Evening Chair: Ed Fry

7:00- 7:30	Robert W. Boyd	Progress in Quantum Imaging
7:30-8:00	George Welch	LWI experiments (tutorial)
8:00-8:30	Anatoly Svidzinsky	Transient Lasing without Inversion
8:30-8:50	BREAK	
8:50-9:00	Eyob Sete	Transient Lasing without Inversion in Helium-like Boron
9:00-9:10	Dong Sun	Soft X-ray Lasing Without Inversion in He Using Pauli Principle
9:10-9:20	Hichem Eleuch	Analytical Solution for 3D Stationary Schrödinger Equation: Implementation of Hygen's Principle for Matter Waves
9:20-9:30	Qingqing Sun	Coherent control of pulse propagation via EIT
9:30-9:40	Chris O'Brien	Refractive Index Control and Modulation in Solid Media
9:40-9:50	Pankaj Jha	Carrier-Envelope Phase Effects in Multi-Photon Excitation
9:50-10:00	Haifeng Zeng	Quantification of spin relaxation and kinetics in reactions studied by hyperpolarized NMR

Friday July 23 *Morning Chair: Alexei Sokolov*

8:30-9:30	Federico Capasso	Plasmonics and metamaterials for near and far-field engineering
9:30-10:00	Patrice Genevet	Plasmonic nanocavities enhance nonlinear optical phenomena
10:00-10:30	BREAK	
10:30-11:00	Dmitri Voronine	Time Reversal in Nanoplasmonic Random Scattering Media
11:00-11:30	Jinwu Ye	"Photon Phase Diffusion and Number Squeezed State"
11:30-12:00	Raymond Ooi	Converting Broadband Incoherent Light into Narrowband Coherent Light for Green Photonics
12:00	LUNCH	

Evening Chair: Marlan Scully

7:00- 7:30	Vladimir Sautenkov	Selective Reflection from a Resonance Atomic Gas
7:30-9:00		Special Topics: General Discussion