SYMPOSIUM ON UNDERGRADUATE RESEARCH

Division of Laser Science of A.P.S - LS XXVII - 19 October 2015 - San Jose , CA

POSTER SESSION – South Tower Foyer - 10:00

Session LM2J: 10:00 AM -12:45 PM, South Tower Foyer - Jenny Magnes, Vassar College, Presider

LM2J-1 - Detecting Pancharatnam's Phase Using Laguerre-Gauss Vortex Beams. *Charlotte Welch, Sean Nomoto, Reeta Vyas, and Surendra Singh, University of Arkansas, Fayetteville, AR 72701.* Interference of a Laguerre-Gauss vortex beam with a plane wave was used to detect Pancharatnam's phase of light due to cyclic evolution of its polarization. Evolution of polarization was controlled by a half-wave plate rotating between two quarter-wave plates. The results are in good agreement with the theoretical predictions. Supported by NSF.

LM2J-2 - Efficient Detection of Neutral Atoms by Electric Field Ionization. *David Dunsky, Igal Bucay, Mark Raizen, Department of Physics, University of Texas at Austin, Austin, TX 78712***.** We propose using high voltage silicon nanowire arrays to field ionize neutral atoms and direct them towards a quadrupole mass analyzer for detection. Applications include efficient detection of atomic and molecular hydrogen. Simulations were performed to find optimal array geometries for large, yet spatially-consistent fields.

LM2J-3 - Ultracold Long Range Molecule Formation with Rb and K. *Cameron Vickers, Yoann Bruneau, and William Stwalley, Department of Physics, University of Connecticut, Storrs, CT 06266.* We are studying the formation of excited long range heteronuclear molecules in an ultracold potassium rubidium magneto-optic trap. The excited molecules, called "butterflies", involve a neutral atom bonding with the electron of a Rydberg atom. We will study states at several atomic asymptotes. Supported by NSF.

LM2J-4 - Evolution of Discord in a System of Two Coupled Quantum Dots. *Sarah Freed, Willa Rawlinson, and Reeta Vyas, Department of Physics, University of Arkansas, Fayetteville, AR 72701.* Evolution of discord, a measure of quantum correlation, for two quantum dots in a cavity driven by strong coherent light is investigated in the presence dissipation and detuning. Discord is compared with measures of entanglement in both bistable and non-bistable regimes. Large discord is found where entanglement is zero. Supported by NSF.

LM2J-5 - An Improved Hybrid Atomic Trap. *Cedric Wilson[1], Joseph Murphree[2], Justin Schultz[2], Nicholas Bigelow[2], 1) University of Utah, Salt Lake City, UT* 84112, *2) University of Rochester, Rochester NY 14627.* A hybrid atomic trap has been modeled computationally for use with a new double MOT cell intended to produce Bose-Einstein condensates. This setup provides superior optical access and reduced complexity over the previous Ioffe-Pritchard based design. The geometry and benefits of the hybrid trap will be discussed. Supported by NSF.

LM2J-6 - Eliminating Mode Hopping in Injection-locked Lasers. *Savannah Vasquez, Jarom Jackson, Dallin S. Durfee, Brigham Young University, Provo, UT 84602.* We will present a simple, inexpensive way to increase the time an injection-locked laser remains locked. Using a feedback circuit that turns the noise it generates into a signal, we send corrections to the current of the laser diode via an integral controller. Supported by NSF and WAESO.

LM2J-7 - Multi-Joule Picosecond Divided Pulse Amplified Pump Laser. *Ahmad Azim, Benjamin Webb, Michael Chini, Nathan Bodnar, Lawrence Shah, Martin Richardson, University of Central Florida, Orlando, FL 32816.* A novel picosecond pump laser for an optical parametric chirped pulse amplification (OPCPA) system to generate few-cycle pulses with multi-terawatt peak power is under development. Active divided pulse amplification is implemented using flash lamp-pumped solid-state Nd:YAG amplifiers to achieve multi-joule energy while avoiding nonlinear phenomena and damage threshold intensities. Supported by Air Force, Army and State of Florida.

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LM2J-8 - Instructional Lab for Undergraduates Utilizing the Hanbury Brown and Twiss Effect. *Adam Kingsley, Dallin S. Durfee, Brigham Young University, Provo, UT 84601.* Using the Hanbury Brown and Twiss effect, students will measure correlation at two detectors in order to discover the diameter of an aperture. The light source will consist of a laser, spatially modulated so that the effect can still be observed and measurements can easily be made.

LM2J-9 - Controllable Dispersion in an Optical Laser Gyroscope. *Owen Wolfe, ShuangLi Du, Irina Novikova, Eugeniy E. Mikhailov, College of William & Mary, Williamsburg, VA 23185.* Several-fold improvements to optical gyroscope sensitivity were predicted for fast light regimes ($n_g < 1$). We evaluated the feasibility of these improvements in the N-bar dual pump scheme in ^{87}Rb vapor. We were able to modify the stimulated gyroscope response via tuning the experimental parameters, but enhancements have not yet been observed. Supported by the NSF and the Naval Air Warfare Center STTR program.

LM2J-10 - Ring-shaped Magnetic Trap for Neutral Atoms. *Milan Brankovic and Nathan Lundblad, Bates College, Lewiston, ME 04240.* We present a design for a ring-shaped magnetic trap for ultracold neutral atoms using only static magnetic fields. We explore how oscillation frequencies in the trap and the minimum magnetic field were affected by trap parameters. We also present effects of a radio-frequency dressing field on the trap properties. Supported by NASA.

LM2J-11 - Interfering One-photon and Two-photon Ionization by Femtosecond VUV Pulses in the Region of an Intermediate Resonance. *Joel Venzke[1], Nicolas Douguet[1], Klaus Bartschat[1], Elena V. Gryzlova[2], Ekaterina I. Staroselskaya[2], and Alexei N. Grum-Grzhimailo[2], 1) Drake University, Des Moines, IA 50311, 2) Lomonosov Moscow State University, Moscow 119991, Russia.* The electron angular distribution after atomic photo-ionization by the fundamental frequency and its second harmonic is analyzed. A left-right asymmetry, due to two-pathway interference between resonant two-photon and non-resonant one-photon ionization, is exemplified by solving the time-dependent Schrödinger equation in the vicinity of the 1s-2p transition in atomic hydrogen. Supported by NSF.

LM2J-12 - A Simple Technique for Studying Near-field Diffraction. *Max Stanley, Martin G. Cohen, and John Noé, Laser Teaching Center, Stony Brook University, Stony Brook, NY 11794.* We studied Fresnel diffraction by a 500 μm circular aperture illuminated by a HeNe laser. Highly magnified patterns were projected on a 2 m distant viewing screen with a 10x microscope objective. Measured lens positions for a sequence of bright- and dark-centered patterns are in excellent agreement with Fresnel theory.

LM2J-13 - Generation of Microwave Signals Using Optically Injected Multimode Vertical-Cavity Surface-Emitting Lasers. *Aashu Jha, Salim Ourari, Andrew Briggs, Hong Lin, Physics and Astronomy, Bates College, Lewiston, ME 04240.* We explored dynamics of a multimode vertical-cavity surface-emitting laser subject to two-frequency, orthogonal optical injection. High frequency microwave signals can be obtained with a tunable range of the order of 10 GHz in the double-frequency locking regime. Supported by NSF and Bates College.

LM2J-14 -Off-Axis Self-Interference Holographic Imaging of an Incoherent 3-D Scene. *Norberto Divilla[1], Timothy Marshall[2], Ziyi Zhu[1], Myung Kim[1], and Zhimin Shi[1], 1) Dept. of Physics, University of South Florida, Tampa FL 33620, 2) Dept. of Physics, Longwood University, Farmville, VA 23909.* We present a work using self-interference incoherent digital holography and polarization rotation interferometry to perform imaging of an incoherent three-dimensional (3D) scene. The off-axis common-path configuration records information of the entire 3D scene in a single shot, and therefore is particularly intriguing for imaging of fast dynamics of biological objects.

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LM2J-15 - Progress Towards Spatially Resolved Single-atom Imaging of ^{6}Li in a Multi-well Potential. *T. Correia, A. Bergschneider, V. M. Klinkhamer, J. H. Becher, S. Murmann, G. Zürn, S. Jochim, Physikalisches Institut, Ruprecht-Karls-Universität Heidelberg, 69120 Heidelberg, Germany.* We prepare low-entropy samples of few atoms in a multi-well potential. To image them with spatial resolution we make them fluoresce by resonant laser beams, collect the emitted photons with a high-resolution objective and detect them on a sensitive camera. Supported by DAAD and the Hoffman Foundation.

LM2J-16 -Multi-Photon Transitions with a Diode Laser and Frequency Comb Spectroscopy. *Amara McCune and Leo Hollberg, Stanford University, Stanford, CA 94305.* Cascade multi-photon transitions in rubidium are achieved with a CW laser, frequency-doubled to 780 nm using PPLN, combined with a frequency-doubled 1550 nm optical comb. Transitions are detected by monitoring Rb fluorescence at 420 nm. This approach should allow access to Rydberg levels. Supported by Stanford Physics.

LM2J-17 - Characterization of Ultrashort Laser Pulses. *Colin Laurence and Michael E. Durst, Middlebury College, Middlebury, VT 05753.* We use a second-order interferometric autocorrelator to measure the pulse width of femtosecond laser pulses. We measure the effect of dispersion compensation in a two-photon microscope and a temporal focusing microscope. The apparatus is fully automated through LabVIEW control and an Arduino motor shield. Supported by an Institutional Development Award (IDeA) from NIH.

LM2J-18 - Construction of a Custom Two-Photon Microscope. *Jacob Epstein and Michael E. Durst, Middlebury College, Middlebury, VT 05753.* We have built a custom two-photon fluorescence microscope for imaging deep within biological tissue without making an incision. Recent enhancements include a dispersion pre-compensation prism pair, a wide-field illumination camera to improve sample positioning, and the construction of a 3D stepper-motor sample stage with an Arduino controller. Supported by the Charles B. Allen Research Fellowship and Middlebury College.

LM2J-19 - Creating Arbitrary 1-D Optical Lattice Potentials with Controllable Tunneling Parameters. *Casey McKenna[1], Philipp Preiss[2] and Markus Greiner[2], 1) Stony Brook University, Stony Brook, NY 11794, 2)CUA, Harvard University, Cambridge, MA 02138.* The problem of calculating tunnel couplings becomes non-trivial for complex super-lattice structures or non-periodic potentials. We developed a rotation method in Hilbert space to calculate the Wannier functions and tunneling parameters. We tested it by projecting a potential onto ^{87}Rb atoms and observing their motion using the Quantum Gas Microscope.

LM2J-20 - Pump-Probe Transient Optical Reflectivity to Measure Coherent Optical Phonons in Two-Dimensional Materials. *Jason Tran, Natalia Molina, Laszlo Frazer, and Eric Borguet, Chemistry, Temple University, Philadelphia, PA 19122.* The vibrational spectroscopy and dynamics of two-dimensional materials and semiconductors can be measured by ultrafast transient reflectivity, a femtosecond laser pump-probe technique. We used lock-in amplification to extract signals buried in the noise so that the coherent optical phonons can be detected.

LM2J-21 - Superradiance in Laser Generated Hyper Rayleigh Scattering. *David Squires, Justin Peatross, and Michael Ware, Brigham Young University, Provo, UT 84602.* We investigate how intense laser light is scattered by helium, argon, and air into non-phase-matched directions as a function of pressure. In contrast with the fundamental, third harmonic light varies quadratically with pressure, which is evidence of superradiant behavior in the absence of phase matching.

LM2J-22 - Design and Construction of a Vacuum Chamber and Optics for Magneto-Optic Trapping of Ytterbium. *Eliza Cornell and Leo Hollberg, Stanford University, Stanford, CA 94305.* An ultra-high vacuum system, along with accompanying optics, has been constructed for a magneto-optic trap, which will eventually be used as an optical atomic clock. The design and construction of the vacuum system and the process of stabilizing the laser's frequency will be presented. Supported by Stanford Physics Department.

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LM2J-23 - Green Laser Pointer Stabilized to Mmolecular Iodine. *Sadhana Senthilkumar, Leo Hollberg, Stanford University, CA 94305.* A green laser pointer is locked to a molecular iodine transition at 532 nm. Strong absorption by iodine is detected in fluorescence. A highly compact wavelength reference, roughly the size of a laser pointer, is assembled. The construction and performance of this reference will be presented. Supported by Stanford Physics.

LM2J-24 - Laser Induced Fluorescence of Thallium-doped Cesium Iodide. *Ryan Wilson, Sydney Shelstead, and Candace Brooks, Timothy Head, and Darby Hewitt, Abilene Christian University, Abilene, TX 79601.* We investigated fluorescence properties of thallium-doped CsI under 404 nm laser excitation at temperatures of 77-300K. Temperature-dependent energy transfer processes have been postulated based on these results.

LM2J-25 - Optical Micromanipulation of Birefringent Objects with Beams with Polarization Singularities. *Ann E. O'Brien, Alex T. MacDonald, and Catherine M. Herne, SUNY New Paltz, New Paltz NY 12561.* We characterize the behavior of calcite in beams with polarization singularities. Because of the birefringence, there is a transfer of spin angular momentum from circularly polarized light to the calcite creating an optical torque which results in the crystal's rotation. Polarimetry is used to confirm the polarization of the beam.

LM2J-26 - Detecting Fraunhofer Diffraction and Exploring Image Reconstruction. *Razvan Stanescu and Jenny Magnes, Vassar College, Poughkeepsie, NY 12604.* To image microscopic organisms, we use cheaper and more mobile methods than microscopy. Using lasers of different wavelengths and strengths, we maximized the expression of the Fraunhofer diffraction. A CMOS camera recorded an image of the diffraction pattern. We may then reconstruct the object using oversampling and retrieve the missing phase using an autocorrelation code. Supported by Vassar College Undergraduate Research Summer Institute and NSF.

LM2J-27 - Analysis and Computational Modeling of *C. elegans* Locomotion using Fraunhofer Diffraction Patterns. *Juan Vasquez, Razvan Stanescu, and Jenny Magnes, Vassar College, Poughkeepsie, NY 12604.* Using the diffraction pattern of trashing *C. elegans* we study the motion of microorganisms in a medium using Fraunhofer diffraction and Fourier analysis. To identify trends due to different methods of locomotion, computational simulations were also analyzed using the same methods. Supported by Vassar College Undergraduate Research Summer Institute and NSF.

LM2J-28 - Hyperfine Structure Measurements of ^{45}ScII. *K. D. Jones[1], D. M. Rossi[1], K. Minamisono[1,2], A. J. Miller[1,2], H. Asberry[3], P. F. Mantica[3], 1) NSCL/MSU, East Lansing, MI 48824, 2) NSCL/MSU,. Physics and Astronomy, East Lansing, MI 488243) SCL/MSU, Dep. Chemistry.* Collinear laser spectroscopy on the ^{45}Sc isotope was performed as a prerequisite for radioactive beam experiments. A hyperfine spectrum was measured for the $3d4s\ {}^3D_1 \rightarrow 3d4p\ {}^3F_2$ electronic transition in ^{45}ScII. Hyperfine coupling constants of both states were obtained by fitting a pseudo-Voigt profile. Supported by NSF.

LM2J-29 - A Connector-based, Mode-locked Erbium Fiber Laser for the Advanced Lab. *Ella Johnson[1], Austin Riedeman[1], Connor Fredrick[1], Chad Hoyt[1], and Jason Jones[2], 1) Bethel University, St. Paul, MN 55112, 2) College of Optical Sciences, University of Arizona, Tucson, AZ.* We describe an ultrafast optics advanced laboratory based on a mode-locked erbium fiber laser (~3400 USD). Ceramic connectors between cavity fibers avoid an expensive fusion splicer. An autocorrelation apparatus characterizes the 181 fs pulses and a parallel gratings apparatus compensates dispersion and compresses the pulses. Supported by NSF.

LM2J-30 - Microcontrollers as an Effective Data Collection Method. *Christine Silveira and Jenny Magnes, Vassar College, Poughkeepsie, NY 12604.* We have used different types of microcontrollers to build portable data collection devices to detect and study the thrashing frequencies of microorganisms, particularly *C. elegans*. This is a continuation of previous work done to study the *C. elegans* movement.

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LM2J-31 - Laser Cooling without Spontaneous Emission using the Bichromatic Force. *Xiang Hua, Christopher Corder, Brian Arnold, and Harold Metcalf, Physics, Stony Brook University, Stony Brook NY 11794.* In this project, we study laser cooling using the bichromatic force. We simulate the atomic motion in short time interval using the Optical Bloch Equations. For both the bichromatic and single-frequency standing wave, our simulation results match very well with our measurements. Supported by ONR and Dept. of Education GAANN.

LM2J-32 - Faraday Effect Based Polarization Control in Rubidium Vapor for Four Wave Mixing Experiments. *H. Bauser[1], Kelly Roman[1], Donna Weber[2], and I. Novikova, 1) College of William & Mary, Williamsburg VA, 213187, 2 Webber University, Babson Park, FL 33827.* I utilize the Faraday Effect to realize a low-loss frequency-selective polarization controller capable of rotating the polarization for an optical field in a narrow frequency range near Rb transition. This controller will be used to selectively adjust polarization for one of the quantum correlated optical fields, produced via four-wave mixing in hot Rb vapor, with the goal to produce polarization Bell states in such system.

LM2J-33 - Realization of a Diffraction-Based 1x100 Optical Switch. *Rachel Sampson[1] and Pierre-Alexandre Blanche[2], 1) Physics and Astronomy, Stony Brook University, Stony Brook, NY 11794-3800[2], 2) College of Optical Sciences, University of Arizona, Tucson, Arizona 85721.* A 1x100 diffraction-based optical switch was designed for use in data centers. The switch is bandwidth-invariant, can be rapidly reconfigured, and allows for send- and receive-side components to be scaled independently. The switch was modeled in Zemax and serves as a proof-of-concept.

LM2J-34 - Optimization of the DPSS Nd:YLF Amplifier Chain for the 263 nm Drive Laser at the FAST Facility. *Julie* M. Gillis[1,2], *James K. Santucci[2], Jinhao Ruan[2], and Dean Edstrom[2], 1) Duquesne University, Pittsburgh, PA 15219, 2) FNAL SIST Program, Fermilab, Batavia, IL 60510.* The photoinjector of Fermilab's electron linac is driven by a phase-locked, YLF laser. Amplification of the 1053 nm seed beam occurs in the diode-pumped solid state amplifier chain through end-pumping of Nd:YLF crystals. With optimization of amplifier optics, the pulses imaged onto the photocathode have been doubled in energy for more effective electron bunch production. Supported by FNAL SIST.

LM2J-35 - Versatile Control Instruments for an Undergraduate Laser Cooling Experiment. *Robert W. A. Brooke, Isaac Davies, Julie M. Gillis, and Theodore A. Corcovilos, Duquesne University, Pittsburgh, PA 15219.* We present a versatile PID control system that showcases the versatility of the Arduino platform. Frequency drift of a HeNe calibration laser is controlled by driving the polarization mode shift to zero. A potassium vapor cell used for saturated absorption spectroscopy is temperature stabilized to 2 mK.

Group Photo Break 12:50 - 1:00 PM

PLEASE assemble at the designated place !!!

PARTICIPANTS' LUNCHEON – Glen Ellen Room - 1:00

The participants' lunch will bring together the Symposium students and several special guests

Lunches will be provided for participants and invited guests only.

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Division of Laser Science of A.P.S - LS XXV - 19 October 2015 - San Jose, CA

ORAL SESSION – Glen Ellen Room - 1:30

Session LM3J: 1:30 - 2:30 PM, Glen Ellen Room - Chad Hoyt, Bethel University, Presider

LM3J-1 - Ultracold Trimer Formation Energetics of Rb and K. *Michael Cantara and William Stwalley, Department of Physics, University of Connecticut, Storrs, CT 06269*. The production of ultracold homonuclear and heteronuclear trimer ions of Rb and K via associative ionization is discussed. Experimental realization of such trimers is proposed, including a discussion of an enlarged collisional cross section resulting from a Rydberg electron acting as a catalyst. Supported by NSF and AFOSR (MURI).

LM3J-2 - Using Frequency Noise Feedback to Stabilize Extended Cavity Diode Lasers. *McKinley Pugh, Jarom Jackson, Enoch Lambert, Dallin Durfee, Brigham Young University, Provo, UT, 84602.* We have found a correlation between the frequency noise on extended cavity diode lasers, and their probability of mode hoping. By monitoring the noise, we are able to feed back to the laser and prevent a mode hop. Supported by BYU and NSF.

LM3J-3 - Updated Modeling of Doppler Cooling in a Penning Trap. *Steven B. Torrisi [1], Joseph Britton[2], Justin Bohnet[2], John Bollinger [2], 1) University of Rochester, Rochester NY 14627, 2) National Institute of Standards and Technology, Boulder, CO 80305*. We updated theory for modeling laser cooling of 2-D ion crystals in a Penning Trap to include new experimental advances, and conducted numerical studies. The theory now accounts for a rotating electric potential and heating from a cooling laser parallel to the trap axis. Supported by NIST.

LM3J-4 - A Repump Laser for Ytterbium Optical Lattice Clocks. *Ananya Sitaram[1], Tai Hyun Yoon[2,3], Andrew Ludlow[2], Chris Oates[2], 1) University of Rochester, Rochester, NY 14627, 2) National Institute of Standards and Technology, Boulder, CO 80305, 3)Korea University Department of Physics, Seoul, Korea 136-701*. Optical lattice clocks are the highest performing atomic clocks to date. We have built a repump laser to improve the stability of the Yb lattice clocks at NIST. This 770 nm laser enables detection of atoms that are otherwise lost due to shelving in a long-lived state. Supported by NSF and NIST.

LM3J-5 - Investigation of the Aberrations of Freeform Surfaces in a Schmidt Telescope. *Zirui Zang, Stephen Weikel, Kevin P. Thompson, and Jannick P. Rolland, The Institute of Optics, Univ. of Rochester, Rochester NY 14627.* Nodal aberration theory predicts the aberration behavior of freeform surfaces. A Schmidt telescope was aligned to experimentally validate these predictions for a coma surface, a key enabler for emerging freeform optics. We predict and validate in experiments the field dependence of comatic surfaces at or away from the aperture stop. Supported by the University of Rochester Xerox Fellowship Program, NSF, and the R.E. Hopkins Center.

SYMPOSIUM ON UNDERGRADUATE RESEARCH

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ORAL SESSION – Glen Ellen Room - 3:00

Session LM4J: 3:00 - 4:00 PM, Glen Ellen Room - Kristan Corwin, Kansas State Univ., Presider

LM4J-1 - Investigation into the Differences Between Incoherent and Pulsed White Light Absorption by Nanoparticles in Solution. *B. Davis, J. Powell, S. Zigo, Y. Qin, C. Sorensen, and C. Trallero-Herrero, James. R Macdonald Laboratory, Kansas State University, Manhattan, KS 66502.* We investigate the difference between absorption spectroscopy done on nanoparticles in solution with incoherent white light and ultrafast pulses of white light. An 800nm, 25 fs, Ti:Sapph laser is focused on a CaF_2 crystal to produce a coherent white light pulse. The nanoparticle absorption spectrum is subsequently measured.

LM4J-2 - Generation and Control of Bessel-Gauss Beams for Optimization of Hollow-core-fiber Coupling. *Maxime. Raoul, A. M. Summers and C. Trallero-Herrero, James. R Macdonald Laboratory, Kansas State University, Manhattan, KS 66502.* Bessel modes represent the natural modes for cylindrical waveguides such as hollow-core-fibers (HCFs). Using an axicon and lens combination we generate a laser focus with a Bessel distribution. Using this setup to couple into HCFs could result in a significant increase in the coupling efficiency compared to current schemes.

LM4J-3 - Orbital Angular Momentum Modal Crosstalk in Bessel-Gauss Beams, *Hunter Rew[1], Abbie T. Watnik[2], 1) College of William and Mary, Williamsburg, VA 23187, 2) U.S. Naval Research Laboratory, Washington, D.C. 20375.* Orbital angular momentum is encoded in Bessel-Gauss modes using spatial light modulators and identified at a detector through conjugate mode demultiplexing. We have investigated crosstalk between modes resulting from effects such as atmospheric turbulence and misalignment. Supported by ASEE and ONR.

LM4J-4 - Dynamics of a Lithium Magneto Optical Trap by High Speed Video Analysis. *Luke Horstman, Seth Erickson, Anna Slattery, Shane Dirks, Chad Hoyt, Bethel University, St. Paul, MN 55112.* Lithium atoms in a magneto-optical trap were perturbed by an amplitude-modulated laser beam and imaged at 10,000 fps. By treating the oscillating atoms as a damped driven harmonic oscillator we are able to investigate the resonant frequency (780 +/- 100 Hz), spring constant and damping coefficient. Supported by NSF.

LM4J-5 - Signal Amplification By Reversible Exchange (SABRE) Enhances NMR Signals in Zero to Ultra-Low Field (ZULF) NMR Spectroscopy. *Jung Pu Tsui, Michael Tayler, Dmitry Budker, University of California, Berkeley, CA 94720.* In ZULF NMR, the low Zeeman polarization results in small NMR signals. Parahydrogen-Induced Polarization is a technique of transferring polarization from the ordered spin states of parahydrogen to the sample molecule. SABRE, a subclass of PHIP, allows for continuous polarization of the substrate. We discuss progress towards signal enhancement in ZULF NMR. Supported by NSF.

APS physics

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Symposium organized by Harold Metcalf and John Noé, Stony Brook University