

**2013 Joint Spring Meeting of the  
Texas Sections of AAPT, APS and  
Society of Physics Students Zone 13**

**Tarleton State University & Texas Physics Consortium  
Stephenville, Texas  
April 4-6**

Thursday April 4, 2013

6:00- 9:00	Registration	Science 1 <sup>st</sup> floor
7:30-9:30	AAPT Business Meeting	Dean's Conference
7:30-9:30	APS Business Meeting	Science 109
7:00-11:00	SPS Social (Food & Games)	Science 103/104, Thompson /Rec. Centers

Friday April 5, 2013

7:00-5:00	Registration	Science 1 <sup>st</sup> floor
8:00-5:00	Vendor Exhibits	Science 2 <sup>nd</sup> floor
8:00-8:15	Introductions	Science 102
8:15-10:55	A1: Plenary Session I	Science 102
10:15-12:00	P1: Workshop (Cannon)	Science 236
11:00-11:48	B1: High Energy Physics	Science 102
11:00-12:00	B2: SPS Career	Science 105
11:00-12:12	B3: Computational Physics	Science 112
12:30-2:00	Lunch (Business Meetings)	Thompson Center
2:00-3:24	D1: Astrophysics & Space Physics I	Science 102
2:00-4:00	D2: Physics Education	Science 109
2:00-3:12	D3: General Physics	Science 112
2:00-4:12	D4: Society of Physics Students	Science 105
2:00-5:00	P2: Workshop (Christian)	Science 236
2:00-5:00	P3: Workshop (Lewis, et. al)	Science 235
3:00-4:00	E1: APS Poster Session	Science 2 <sup>nd</sup> Floor
3:24-4:24	G3: Nanoscience & Solid State	Science 112
4:00-5:00	H1: Spin-Up Cracker Barrel	Science 102
4:00-5:00	K1: SPS Poster Session	Science 2 <sup>nd</sup> Floor
6:30-7:00	Social	City Hall @ City Limits
7:00-8:30	Banquet	City Hall @ City Limits
8:30-11:00	Star Party	Tarleton Observatory

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Saturday April 6, 2013

8:00-9:30	Registration	Science 1 <sup>st</sup> Floor
8:00-12:30	Vendor Exhibit	Science 2 <sup>nd</sup> Floor
8:15-10:15	M1: Plenary Session II	Science 102
10:30-11:54	N1: Astrophysics II	Science 102
10:30-12:06	N2: High Energy II	Science 109
10:30-11:30	N3: Solid State Physics II	Nursing 108
10:30-12:30	P4: Workshop (Singh)	Science 236
10:30-12:30	P5: Workshop (Cannon)	Science 234
12:45-2:45	P6: Workshop (O'Kuma)	Science 236
12:45-2:45	P7: Workshop (Bryant)	Math 304

**Special Groups (Invitation Only)**

Friday April 5, 2013

5:15-6:15	Texas Physics Consortium Meeting	TBD
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### **A1: Plenary Session I (Friday 8:00-10:55)**

Chair: Daniel K. Marble, Tarleton State University Science 102

- 8:00 Welcome
- 8:15 “*Building a National Digital Library for Computational Physics at All Levels,*”  
Wolfgang Christian of Davidson College
- 8:55 “*Why, What, Who, and How- All about Medical Physics,*” Dharanipathy Rangaraj  
of Scott & White Hospital
- 9:35 “*Paths into the Schrodinger Equation via Classical and Quantum Field Theories,*”  
Marlan Scully of Texas A&M University
- 10:15 “*The 2-D World of Chemistry: Graphene and Other Interesting Materials,*” Gary  
Beall of Texas State University

### **B1: High Energy Physics I (Friday 11:00-11:48)**

Chair: Jimmy J McCoy, Tarleton State University Science 102

- 11:00 “Talk has been moved to Saturday at 12:06”
- 11:12 “*Clarifying the Structure of the Nucleon: Status of the SeaQuest Experiment  
(Fermilab E906),*” Larry Donald Isenhower
- 11:24 “*Higgs in Hot and Dense Background,*” Samina Masood
- 11:36 “*D-Dimensional Gauge Models,*” Douglas Moore, Jared Greenwald, Gerald  
Cleaver

### **B2: SPS Career Session (Friday 11:00-12:00)**

Chair: Daniel K. Marble, Tarleton State University Science 105

Guest panel discussion and Question and Answer session with students on careers  
in STEM fields.

### **B3: Computational Physics (Friday 11:00-12:12)**

Chair: Bryant Wyatt, Tarleton State University Science 112

- 11:00 “*Tangential Relations Between Distorted Angles vs. Original Angles of a Traveling  
General Triangle in Special Relativity,*” Florentin Smarandache
- 11:12 “*Comparison of Correlation Function for Path Integral Formulation of Ortho-  
Positronium in Dense Fluids,*” Terrence Reese, Bruce Miller
- 11:24 “*Functional Programming in Scientific Computing,*” Douglas Moore
- 11:36 “*Endohedral Fullerene as Acceptor: A DFT Study in Charge Transfer States of  
Sc<sub>3</sub>N@C<sub>80</sub>-Porphyrin Complex,*” Fatemeh Amerikheirabadi, Luis Basurto,  
Rajendra Zope, and Tunna Baruah
- 11:48 “*Orthogonal Polynomial Projection Quantization: A New Hill Determinant  
Formation,*” Carlos Handy, Daniel Vrinceanu
- 12:00 “*Follow-on Studies of Hydrogenic Quantum Systems Using the Feynman-Kac Path  
Integral Method,*” J.M. Rejcek, N.G. Fazleev

## **D1: Astrophysics and Space Physics I (Friday 2:00-3:24)**

Chair: Shaukat Goderya, Tarleton State University Science 102

- 2:00 “*O-C Calculations for Two New Binaries and V1097 Herculis*,” James John Meier, Richard Olenick, Arthur Sweeney, Jeffrey Schniederjan, and Matthew Heuser
- 2:12 “*Using Virtual Sattelite Passes Through the Earth’s Magnetosphere to Infer Properties of the Ionosphere*,” Robert Bruntz, Ramon Lopez
- 2:24 “*Abell Cluster Catalog for the Purpose of Supernova Discovery*,” James Boshart, Michael Hibbs
- 2:36 “*Comparison of Neutron Star Models Using Various EOS*,” Michael Naizer, Carlos Bertulani, William Newton
- 2:48 “*The Physics of Spacecraft Propulsion Via Quark Pair Production from Parallel Electric and Magnetic Fields*,” Gerald Cleaver
- 3:00 “*A Three-decade X-band VLBI Study of the Nuclei in the Lobe-dominated Quasars 3C207 and 3C263*,” David Hough
- 3:12 “*PHOEBE Modeling of Three New Binaries in Hercules*,” Jeffrey Schniederjan, Richard Olenick, Arthur Sweeney, James Meier, Matthew Heuser

## **D2: Physics Education (Friday 2:00-4:00)**

Chair: Eric Hagedorn, University of Texas at El Paso Science 109

- 2:00 “*Why You Should Have Las: A Student Perspective*,” Jessica Conn, Eleanor Close
- 2:12 “*Investigative Study on the Correlation Between High School Student Mental Rotation Test (MRT) Scores and State Assessment Scores and Grades in STEM Classes*,” Alfonso Hinojosa, Ramon Lopez
- 2:24 “*My Learning Assistant Experience at Texas State*,” Taylor Shimek, Eleanor Close
- 2:36 “*Simplifying Avogadro’s Number an Activity for Teachers*,” James Roberts, Betty Crocker
- 2:48 “*Winter Break Effect in General Education CLASS Results*,” David Donnelly, Hunter Close, Eleanor Close
- 3:00 “*Conceptual Inventory and Assessment Results from a Department at Risk*,” Beth Thacker
- 3:12 “*Students Gestures About Complex Wave Functions for One-Dimensional Potentials*,” Catherine Schriber, Hunter Close, Eleanor Close, David Donnelly
- 3:24 “*Integrating Computational Physics Problems Into Upper Division Physics Curriculum*,” Tikhon Bykov
- 3:36 “*Students’ Dynamic Geometric Reasoning About Quantum Spin-1/2 States*,” Hunter Close, Catherine Schriber, David Donnelly, Eleanor Close
- 3:48 “*Recognizing the Unobservable Properties of the Physical Universe*,” Lionel Hewett

### **D3: General Physics (Friday 2:00-3:00)**

Chair: Carlos Handy, Texas Southern University Science 112

- 2:00 “*Electron Nuclear Dynamics Simulations of Proton Collisions with Water in Proton Cancer Therapy*,” Jieun Yoo, Austin Privett, Christopher Stopera, Jorge Morales
- 2:12 “*Quantitative Phase Microscopy of Cellular Fluctuations Modulated by Optogenetic Stimulation*,” Bishorup Banjara, Nelson Cardenas, Samarendra Mohanty
- 2:24 “*Polynomial Preconditioned GMRES-DR*,” Quan Liu
- 2:36 “*A Classical Model of Helium*,” James Espinosa, James Woodyard
- 2:48 “*Electronic Structure and Charge Transfer States of a Multichromophoric heptad antenna*,” Louis Basurto, Tunna Baruah, Rajenda Zope

### **D4: Society of Physics Students (Friday 2:00-4:12)**

Chair: Bryant Wyatt, Tarleton State University Science 105

- 2:00 “*An N-Body Study of Late Lunar-Forming Impacts*,” Justin Eiland, Brett Hokr, Justin Highland, Travis Salzillo, Bryant Wyatt
- 2:12 “*Development of a NIFFTE Clean Glove Box*,” William Lynn
- 2:24 “*Measuring Light Emitting Diodes with a Scanner for Radiant Flux and Color Characterization*,” Anthony Phung, Clint Naquin, Omar Hasa, Wei-Ting Liou, Roxanne Lee, Armand Halbert, An-Ting Liu, Emin Bursa, David Taylor, Jason Slinker
- 2:36 “*Graphitic Carbon Nitride Fabrication*,” Adam Collard, Yancen Li, Joel Therrien
- 2:48 “*The Mechanism, Safety, and Prospect of Microwave Oven*,” Angela Li
- 3:00 “*Learning New Skills With Undergraduate Research*,” Gregory Beuhler, Nikoleta Theodoropoulou
- 3:12 “*Elastic and Inelastic Neutron Scattering Cross Sections on  $^{23}\text{Na}$* ,” L. Sidwell, B. Combs, S.F. Hicks, J.R. Vanhoy, E.E. Peters, B.C. Crider, A. Kumar, M.T. McEllistrem, F.M. Prados-Est’vez, S.W. Yates
- 3:24 “*The Acoustic Analogue of the Reissner-Nordstrom Metric*,” Dasith de Silva, Kenny F. Stephens II
- 3:36 “*Trends in Light n-Capture Elements*,” Tristan Odekirk, Jacob Teffs
- 3:48 “*Comparing the 2MASS and WISE Infrared Database for Classification of Background Stars and Embedded Young Stellar Objects*,” John Grzehowiak, Samantha Simpson, Richard Beach, Sachindev Shenoy, Dwight Russell
- 4:00 “*PyCBC: A Toolkit for Advanced-Detector Era Gravitational Wave Data Analysis*,” Andrew Miller, Duncan Brown, Tito Dal Canton, Badri Krishnan, Alex Nitz, Josh Willis

### **G3: Nanoscience and Solid State Physics (Friday 3:24-4:24)**

Chair: Mirley Balasubramanya, Texas A&M University-San Antonio Science 112

- 3:24 “*Electron Transmission Through a Graphite Crystal*,” Cristian Bahrim, Robert Nick Lanning
- 3:36 “*Extraordinary Properties of Carbon Nanotubes and Their Use in Technology and Medicine*,” Michael Duran, Michael Jacobs, Daniel Bullmore, Samina Masood
- 3:48 “*A Study of Dielectric Relaxation Using Microwave Technology*,” James Roberts, Jai Dahiya, Santeel Ghosh
- 4:00 “*Improving Light-Emitting Electrochemical Cells with Ionic Additives*,” Jason Slinker, Yulong Shen, Brad Holliday
- 4:12 “*Ab Initio Study of Mechanical Properties of n- and p-type Doped PbTe and PbSe*,” John Petersen, Luisa Scolfaro, Thomas Myers

### **M1: Plenary Session II (Saturday 8:15-10:15)**

Chair: Daniel K. Marble, Tarleton State University Science 102

- 8:15 “*ADS Fission in a Molten Salt Core- How to Safely Close the Nuclear Fuel Cycle*,” Peter McIntyre of Texas A&M University
- 8:55 “*Research-based Tools and Tips for Teaching Quantum Mechanics*,” Chandralekha Singh of the University of Pittsburgh
- 9:35 “*High Energy Focused Ion Beams: Technology and Applications*,” Gary Glass of the University of North Texas

### **N1: Astrophysics II (Saturday 10:30-11:54)**

Chair: Michael Hibbs, Tarleton State University Science 102

- 10:30 “*Estimating the Viscous Potential Value Using SuperDARN data*,” Michael Mishler, Kyle Van Zuiden, Denver Scott, Aaron Baca, Shree Bhattarai, Ramon Lopez
- 10:42 “*Interaction of Space, Time, Mass Relation – Constant of LIZI*,” Yongquan Han,
- 10:54 “*Analyzing the Parameters of Corotating Interaction Regions and Their Relationship with Geomagnetic Storms*,” Phu Nguyen, Soha Aslam, Kyle Van Zuiden, Kevin Pham, Ramon Lopez
- 11:06 “*Evaluation of Two Transit Algorithms*,” Matt Heuser, Richard Olenick, Arthur Sweeney, James Meier, Jeff Schneiderjan
- 11:18 “*Big Bang Nucleosynthesis with a Non-Maxwellian Distribution*,” John Fuqua, Carlos Bertulani, Mahir Hussein
- 11:30 “*Comparisons Between Observations and Simulations of Solar Wind Magnetic Field Reversals*,” Brett Schock, Spencer Durrenberger, Robert Bruntz, Ramon Lopez
- 11:42 “*The Effects of Modifying the Solar Wind Input into an MHD Simulation of the Whole Heliosphere Interval*,” Kevin Pham, Ramon Lopez

## **N2: High Energy Physics II (Saturday 10:30-12:12)**

Chair: Jimmy J. McCoy, Tarleton State University Science 109

- 10:30 “*The Unification of Symmetry and Conservation*,” Sergio Pissanetzky  
10:42 “*Quantum Vacuum Energy Torque Anomaly*,” Hamilton Carter  
10:54 “*Study of Long Term Stability of gas Electron Multiplier Radiation Detector*,” Ying Wun Yvonne Ng, Jaehoon You, Seongtae Park, Samantha LaCombe, Timothy Blake Watson, Amit Bashyal  
11:06 “*Induced Anomalous Magnetic Moment in a Magnetized Quark System*,” Matthew Quiroz, Efrain Ferrer, Vivian de la Incera  
11:18 “*The MSRT, The Interpretation of the Lorentz Transformation Equations Faster Than Light, The Cherenkov Radiation, Wormholes, and The Pioneer Anomaly*,” Azzam AlMosallami  
11:30 “*Measurements of the Structure of the Nucleon*,” Rusty Towell  
11:42 “*Investigation of Electric Sparks on the Failure of GEM Radiation Detector Prototype*,” Amit Bashyal, Jaehoon Yu, Seongtae Park, Ying Wun Yvonne Ng, Samantha LaCombe, Timothy Blake Watson.  
11:54 “*Long-Term Stability Gas Electron Multiplier Radiation Detector with One-Bit Digital Readout*,” Samantha LaComb, Seongae Park, Amit Bashyal, Blake Watson, Yvonne Ng  
12:06 “*Detector Design Studies for High Precision Particle Physics Experiment*,” Timothy Watson, Samantha Lacombe, Amit Bashyal, and Yvonne Ying.

## **N3: Solid State Physics II (Saturday 10:30-11:30)**

Chair: Daniel Vrinceanu, Texas Southern University Nursing 108

- 10:30 “*Engineering the Band Gap of  $\alpha\text{-Fe}_2\text{O}_3$  by Isovalent Sulfur Doping*,” Qiming Zhang, Congxin Xia  
10:42 “*Using Resonant Microwave Cavities for Material Properties*,” James Roberts, Jai Dahiya, S Ghosh  
10:54 “*New Sensitivity Regimes in Nuclear Magnetic Resonance*,” Daniel Tennant, Isaac Manzanera, Jeremy Paster, John Markert  
11:06 “*Experimental Search for Bremsstrahlung Radiation Predicted by the Hole theory of Superconductivity*,” Hamilton Carter  
11:18 “*DNA in Nanoscale Electronics*,” Jason Slinker, Chris Wohlgamuth, Marc McWilliams, Alon Gorodetsky

## **E3: APS Poster Session (Friday 3:00-4:00)**

Chair: Travis Salzillo, Tarleton State University Science 2<sup>nd</sup> Floor

- E1 “*Optical Foucault Pendulum*,” Richard Selvaggi, Charles Rogers  
E2 “*Effects of Coherent Population Trapping on Raman Scattering*,” Marshall Rogers, Stephen Schiller, Yuri Rostovtsev  
E3 “*Correlation Between Corotating Interaction Regions’ Magnetic Orientations and Magnetic Storm Strengths Near Earth*,” Joseph Schinco, Blake Barnett, Kevin Pham, Ramon Lopez

- E4 “*How the Fluctuation Amplitude of the Interplanetary Magnetic Field’s Z Component Affects Geomagnetic Storm Strength.*” Cezanne Narcisse, Spencer Durrenberger, Jane Sterrett, Soha Aslam, Kevin Pham, Ramon Lopez
- E5 “*Searching for the Evidence of Reduction of Viscous Potential for Northward Interplanetary Magnetic Field,*” Denver Scott, Kyle Van Zuiden, Michael Mishler, Aaron baca, Shree Bhattarai, Ramon Lopez
- E6 “*Analyzing Solar and Magnetic Field Reversal for a Variety of Conditions in an MHD Simulation,*” Spencer Durrenberger, Brett Schock, Robert Bruntz, Ramon Lopez
- E7 “*Temperature Dependent DNA Charge Transport,*” Chris Wohlgamuth, Marc McWilliams, Jason Slinker
- E8 “*Biological Effects of Electromagnetic fields on bacterial Properties,*” Derek Smith, Babak Keyghobadi, Beheshte Eftekhari, Samina Masood
- E9 “*Antihydrogen-Gravity Experiment: An Analytical Model for Parallel Plate Geometry,*” J.R. Rocha, Carlos Ordonez
- E10 “*Electronic Structure of Planar Aggregates of Boron Clusters,*” Carlos Diaz, Luis Basurto, Tunna Baruah, Rajendra Zope
- E11 “*A New Algorithm Development of the Frequency Analysis,*” Richard Kyung, Eugene Lee
- E12 “*Density Functional Theory (DFT) Study of the Electronic Structure of  $Bi_{20}Ti_2O_6$  for Hydrogen Production by Water Splitting,*” David Baker, Cedric Mayfield, Vaidyanathan Subramanian, Muhammad Huda
- E13 “*Phase Transitions Within Ferrofluid and Piezoelectric Fluid,*” Bryan Wolford
- E14 “*Characterization of Multiferritic  $BiFeO_3$  Synthesis by RF Magnetron Sputtering,*” Gregory Spencer, Rye Johnson, Anup Bandyopadhyay
- E15 “*Ellipsometric Analysis of Silicon Nanoparticles Formed by Rapid Thermal Annealing,*” Chad Waxler, Gregory Spencer, Anup Bandyopadhyay
- E16 “*Heating Induced Structural and Chemical Behavior of  $KD_2PO_4$  in 25 C to 215 C Temperature Range,*” Andres Encerrado Manriquez, Adan Anchondo, Joshua Morris, Cristian Botez
- E17 “*Regenerated Spider Silk Possess Mechanical Properties of Super-and Cyclic Contraction in Response to Environmental Humidity,*” Shan Lu, Ganesh Swaminathan, Samuel Evans, Todd Blackledge
- E18 “*Density Functional Study of the Oxygen Adsorption on the Cu (110) Surface,*” Antoine Olena, N.G. Fazleev
- E19 “*Space Station Twin Paradox,*” Florentine Smarandache
- E20 “*Effects of the Surface Plasmon Excitations on Photoluminescence by CdSe/ZnS Quantum Dots,*” Ankit Singh, Suresh Sharma
- E21 “*Quark Propagator in a Theory of Massless Fermions with Superfluidity,*” Sajib Barman, Vivian Incera

### **K1: SPS Poster Session (Friday 4:00-5:00)**

Chair: Chris Marble, Tarleton State University

Science 2<sup>nd</sup> Floor



- K1 “*Designing and Building a Tabletop Molecular Acoustics Experiment*,” Ashley Hicks, William Slaton
- K2 “*Controlled Drug Delivery from Therapeutic Contact Lenses: The Need for Accurate Release Studies*,” Payam Pourjavad
- K3 “*An Analysis of the Texas Physics Teaching Certification from 2007-2011*,” Kristin Holz
- K4 “*Absorption Properties of NASA Flight Approved Materials and Other Testable Samples*,” Matthew Sisson, Justin Mann, William V. Slaton
- K5 “*Electronic Structure of Dye Attached Fullerenes*,” Amanda Garnica, Rajendra Zope, Tunna Baruah
- K6 “*Design and Testing of a Custom Air Horn*,” Jerrod Ward, William V. Slaton
- K7 “*Alternative Visualization Methods of Wine Glass Resonance*,” Shelby Burns, William Slaton
- K8 “*Analysis of Atomic Emission Spectra: A Refined Way to Understand the Photon Concept*,” Sara-jeanne Vogler, Keeley Townley-Smith, Cristian Bahrim
- K9 “*Dynamic Optimization on the Eigenvalue Problems*,” Katherine Oh, Richard Kyung

### Workshops

- Friday 10:15-12:00 Science 236  
**P1: “Ranking Tasks for Today’s Classrooms”** presented by Trina Cannon, Highland Park High School
- Friday 2:00-5:00 Science 236  
**P2: “Using and Adapting OSP-Based Materials for Interactive Classroom”** presented by Wolfgang Christian, Davidson College
- Friday 2:00-5:00 Science 235  
**P3: “Teacher Geek Catch the Bug”** presented by Jill Lewis, Sargent Welch
- Saturday 10:30-12:30 Science 236  
**P4: “Research-based Tools and Tips for Teaching Quantum Mechanics”** presented by Chandralekha Singh, University of Pittsburgh
- Saturday 10:30-12:30 Science 234  
**P5: “Context Rich Problems and Other Strategies”** presented by Trina Cannon, Highland Park High School
- Saturday 10:30-12:30 Science 236  
**P6: “Video Analysis in the Introductory Physics Lab”** presented by Tom O’Kuma and Regina Barrera, Lee College
- Saturday 10:30-12:30 Science 234  
**P7: “Supercomputing for Under \$1,000”** presented by Bryant Wyatt and Justin Eiland, Tarleton State University