

American Physical Society New England Section Newsletter

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Fall 2016

**Fall 2016 Meeting of the APS-NES, October 28-29, 2016
Massachusetts College of Liberal Arts, North Adams MA**

MCLA



Theme:

Undergraduate Research: Pedagogy and Possibilities

All agree that undergraduate research is a key component for physics students. At this meeting, we will highlight the physics research done with undergraduates from a variety of institutions, ranging from community college to research university.

Banquet Speaker:

Chad Orzel, Union College, author of *How to Teach Quantum Physics to your Dog*

Invited Speakers :

Chantale Damas, Queensborough Community College

Erin Kiley, Massachusetts College of Liberal Arts

Tiku Majumder, Williams College

Ben Schumacher, Kenyon College

Gabe Spalding, Illinois Wesleyan University

Conference website: https://mcla.digication.com/nesaps_fall_2016_meeting/Home/

News from Fall 2016 APS-NES Host and Meeting at MCLA, North Adams, MA

MCLA RECEIVES NATIONAL SCIENCE FOUNDATION GRANT TO FUND SCHOLARSHIPS FOR STEM MAJORS

In August 2014, MCLA received a National Science Foundation (NSF) Scholarship in Science, Technology, Engineering and Mathematics grant for \$639,826 to fund annual scholarships in the amount of \$5,000 for 32 students who major in biology, physics, chemistry, environmental studies, computer science, or mathematics. To date, the "STEM Pathways Program" has awarded 26 students scholarships through this grant; funding will continue through July 2019.

In addition to scholarships, the STEM Pathways Program provides scholarship recipients with academic support, enrichment activities, as well as career development and research opportunities, to ensure that they complete their degrees and are prepared to enter the STEM workforce or a STEM-related graduate program.

According to Dr. Monica Joslin, Dean of Academic Affairs, MCLA's STEM programs are thriving. "Thanks to the efforts of faculty, administrators, and the academic and career development support services offered through MCLA's Center for Student Success and Engagement (CSSE) over the past five years, an increasing number of the College's students are graduating with STEM degrees," Joslin said. "Extending access to our STEM programs to talented students with financial need is an important part of MCLA's mission as the Commonwealth's Public Liberal Arts College."

U.S. DEPT. OF EDUCATION AWARDS \$2.2 MILLION TO MCLA

Last month, Massachusetts College of Liberal Arts (MCLA) was awarded a \$2.177 million Title III "Strengthening Institutions Program" grant from the United States Department of Education to increase retention and graduation rates of students from low-income families and students of color over the next five years.

The \$2.177 million Title III grant will be dis-



6th Graders visit MCLA physics department

This funding allows MCLA to offer scholarships that directly address an area of national concern: the shortage of United States graduates trained in STEM-related fields. Scholarships for academically strong STEM students, who may not otherwise be able to afford college, will impact the number of STEM graduates prepared to help Massachusetts companies continue to advance the knowledge that is producing life-changing innovations, Joslin said.

MCLA's STEM Pathways Program is under the direction of biology professor Dr. Ann Billetz, principal investigator, computer science professor Dr. Mark Cohen, physics professor Dr.

Emily Maher, and math professor Dr. Elizabeth Hartung.

"Talented STEM graduates help U.S. industries compete and innovate in a global economy," said NSF Program Director John Krupczak. "This project provides resources to undergraduates in STEM to help them be successful."

MCLA is the Commonwealth's public liberal arts college and a campus of the Massachusetts state university system. MCLA promotes excellence in learning and teaching, innovative scholarship, intellectual creativity, public service, applied knowledge, and active and responsible citizenship. MCLA graduates are prepared to be practical problem solvers and engaged, resilient, global citizens.

tributed to MCLA over the next five years. A significant portion of this grant will be used to develop curriculum to incorporate an undergraduate research component in all academic programs as well as purchase equipment to support undergraduate research.

The ability to work with state-of-the-art tools will not only prepare students to excel in their majors, but also to compete for and receive employment in growing science, technology, and knowledge econ-

omy industries. One-third of MCLA students major in science, technology, engineering, and math (STEM) fields, and 30 percent of the Class of 2020 selected a STEM discipline as their major.

"What wonderful news to receive as we welcome our students to campus this fall," MCLA's President James Birge said. "Twenty-seven percent of the Class of 2020 self-identify as coming from diverse backgrounds, so this

News from Fall 2016 APS-NES Host and Meeting at MCLA, North Adams, MA

funding will support and promote the success of MCLA students. In addition, the program will lead to students graduating sooner, which means they will spend less on their education overall and graduate with minimum debt, with a degree that provides the foundation for a successful career.”

Last spring, the U.S. Department of Education recognized MCLA as one of only 13 institutions in the nation currently graduating students from low-income and high-income families at the same rate.

Thirty-nine percent of MCLA students are from families that earn less than \$40,000 a year—the highest percentage in the state university system—and 46 percent receive Pell grants, a federally funded grant program for low income students.

MCLA admits a high percentage of students from underserved and minority populations. Over the past five years, the College is closing the achievement gap in graduation rates between African-American and white students at a higher percentage rate than all but one of the other state universities in the Massachusetts State University System, according to the state’s latest Vision Project report.

“I’m very proud to see MCLA emerging as a national leader for its work in developing winning strategies to recruit, retain, and graduate more low-income students and students of color,” said Carlos E. Santiago, Massachusetts Commissioner of Higher Education. “Here in Massachusetts, the College’s success provides a critical model for other campuses and will help our public higher education system reach its goal to graduate more students in less time.”

The “Strengthening Institutions Program” supports MCLA’s mission to promote excellence in learning and teaching, innovative scholarship, intellectual creativity, public service, applied knowledge, and active and responsible citizenship.



MCLA President James F. Birge

MCLA PHYSICS’ ADVANCED LAB COURSE

MCLA’s Advanced Lab experience is a two-course sequence for senior physics majors. The content of this sequence includes electronics and methods of data analysis, but the primary intent of the sequence is to provide a complete research experience for students.

In the first semester, students research a topic, design an experiment, and write a proposal for funding. The second semester is devoted to the experiment itself. All students work on individual projects which they have designed and built themselves.

Because we are a small public liberal arts college, students are encouraged to be creative in designing experiments on a tight budget. Typical projects are designed around equipment owned by the MCLA physics department, and each student is awarded up to \$300 to buy additional components. Past project titles have included

Optical Probe of Transient Heat Conduction
Measuring the Hall Effect in Semiconductors
Oscillation Modes of Pipes
Flashlamp-pumped Dye Laser
Spectroscopic Measurement of Band Gap Energy
Observing the Maxwell-Boltzmann Distribution due to LED Internal Heating

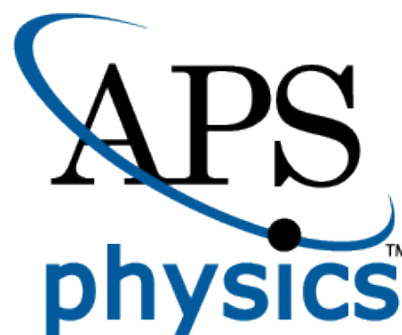
During the second semester, students meet weekly for group meeting, where they discuss their progress of the previous week and help one another with experimental challenges. At the end of the second semester, in addition to writing a paper on their research, students

prepare posters for presentation at MCLA’s annual Undergraduate Research Conference. At the end of the second semester students prepare posters for presentation at MCLA’s annual Undergraduate Research Conference.

We have designed and use an assessment scheme that includes guidelines and rubrics for summarizing articles, writing a grant proposal, keeping a laboratory notebook, designing a poster, and presenting results.



Presenting at the MCLA’s Undergraduate Research Conference



News from Fall 2016 APS-NES Host and Meeting at MCLA, North Adams, MA

MCLA'S FEIGENBAUM CENTER FOR SCIENCE & INNOVATION ACHIEVES LEED GOLD CERTIFICATION

In September, MCLA announced that the Feigenbaum Center for Science and Innovation, which opened Fall 2014, had been awarded LEED Gold certification by the United States Green Building Council (USGBC).

The LEED (Leadership in Energy and Environmental Design) rating system, developed by USGBC, is the foremost program for buildings, homes, and communities that are designed, constructed, maintained, and operated for improved environmental and human health performance.

According to MCLA President James F. Birge, the Feigenbaum Center for Science and Innovation is a model of sustainability. The building's photovoltaic solar panel array, he said, is just one feature that helps make this 65,000-square-foot, high-tech building exceptionally energy-efficient. "Sustainability is extremely important to MCLA," Birge said. "We are delighted that our Center for Science and Innovation has been recognized at this very high level of certification."

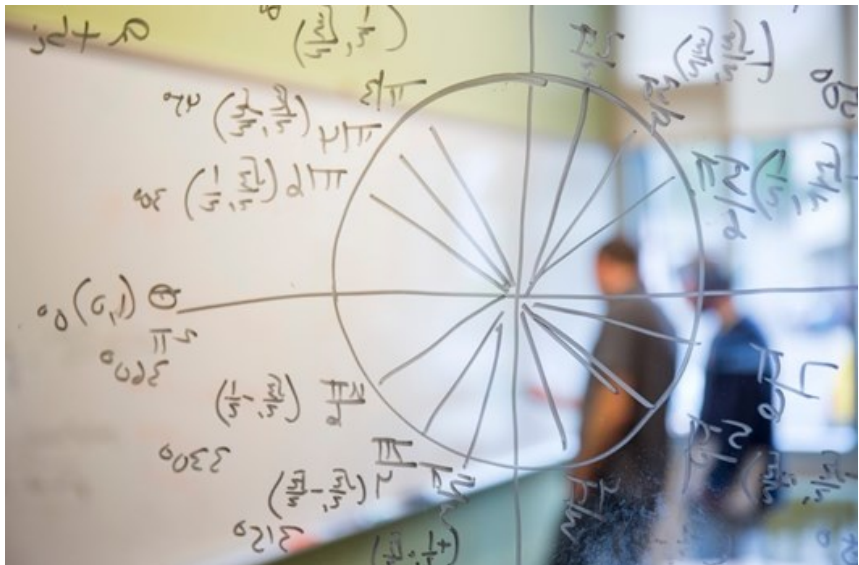
"MCLA's LEED certification demonstrates tremendous green building leadership," said Rick Fedrizzi, CEO and founding chair, USGBC. "The urgency of USGBC's mission has challenged the industry to move faster and reach further than ever before, and MCLA serves as a prime example of just how much we can accomplish."

In addition to its LEED certification, the Feigenbaum Center for Science and Innovation features state-of-the-art classrooms, laboratories, research, and presentation spaces, a greenhouse, a rooftop classroom, and outdoor instruction areas. It is home to MCLA's biology, chemistry, physics, environmental studies, and psychology departments.

Like the Science Center, MCLA's recently renovated Bowman Hall is LEED-certified and features heat- and cooling-efficient devices, new windows, and digital controls that provide operational cost savings. This facility includes computer networking and robotics labs, as well as new offices, classrooms, and plentiful collaborative workspaces. It is home to MCLA's math, computer science, and visual art departments.



Feigenbaum Center for Science and Innovation



MCLA Physics Common Room

Join APS-NES
at
www.aps.org

Recap of Spring 2016 Meeting of APS-NES at Wheaton College



The Spring 2016 Meeting of the APS New England Sections took place at Wheaton College in Norton, MA on April 1-2, 2016

The theme of the meeting was *Fluids Dynamics of Very Large and Very Small Systems*. The plenary talks examined fluid dynamics on a wide range of scales. On a large scale, the Earth's oceans control heat transfer from the tropics, CO₂ and O₂ levels in the atmosphere, and climate change; they also support vast ecosystems, with swimmers ranging in size from a few microns (zooplankton) to several meters (whales). Fluids beyond the earth, such as the ocean on the Jovian moon of Europa, are beginning to inform our understanding of the history of the Solar System. On the small scale, nano and micro fluidics now allow us to manipulate fluid flow at the cellular level. At all scales, fluid motion is controlled a common set of factors (viscous forces, pressure gradients, turbulent transfer of heat and momentum), but these processes vary over many orders of magnitude. Fluid motions present interesting challenges for

direct observation, and extreme challenges for computational modeling.

The meeting started on Friday afternoon with introductory remarks by John Collins, APS-NES Chair, and Chair of the Department of Physics at Wheaton



John Collins giving introductory remarks at the meeting

Recap of Spring 2016 Meeting...



Claudia Cenedese presenting her invited talk



James Bird presenting his invited talk



Blair Perot presenting his invited talk

College. This was followed by invited talks on Physics of Fluids. This session was chaired by Jason Goodman of Wheaton College. The first talk was on “*The Dynamics of Greenland’s Glacial Fjords and Their Role in Climate*” and was presented by Claudia Cenedese, of Woods Hole Oceanographic Institute. After a short break the second talk was on “*Bursting Bubbles in Search of Invisible Droplets*” and was presented by James Bird of Boston University. Blair Perot of the University of Massachusetts - Amherst, closed the Friday afternoon invited session with a very interesting talk titled “*Superhydrophobic Drag Reduction*”. After a short break, the poster session took place at the Mars Center for Science and Technology - Spencer-Davis Café. An overview of the wide array of interesting physics presented at the poster session is on page 16.

The Friday evening was closed with the a delicious banquet at Emerson Faculty dining room, and a keynote address titled “*The Extremes of Fluid Dynamics*” by Nicole Sharpe of FYFD.

Saturday morning started of with a Continental breakfast between 8 am and 9 am at the Science Center lobby. This was followed by Part II of the Invited Talks session on the Physics of Fluids which started at 9 am in the Hindle Auditorium of the Science Center. This session was chaired by John Collins of Wheaton College.

The first of two invited talks was titled “*Tidal Heat and Fluid Flow on Pluto*” and given by Geoff Collins of Wheaton College. The second was by Jason Goodman of Wheaton College, and was titled “*Alien Seas: Fluid Flow of Oceans Throughout the Solar System*”

Two parallel Contributed Sessions - a General session and a session on Fluid Dynamics, followed the morning’s invited talks. The meeting ended at 12:15 pm and was followed by the meeting of the Executive Committee at 12:30pm.

Recap of Spring 2016 Meeting...



**Nicole Sharpe,
giving keynote
address at the
banquet**



Top left: Geoff Collins of
Wheaton College, giving invited
talk on “*Tidal Heat and Fluid
Flow on Pluto*”



Bottom left: Jason Goodman of
Wheaton College giving invited
talk on “*Alien Seas: Fluid Flow
of Oceans Throughout the
Solar System*”

Recap of Spring 2016 Meeting... Contributed Session



Dipankar Maitra of Wheaton College, chairing the General Session



Scott Atkins of Central Connecticut State University presenting on *"The Data Matrix: Dynamic Analysis of Remote Sensing Measurements"*



Dipti Sharma, of Wentworth Institute of Technology on *"Observation of Multiple Activation in Tg of $\text{Se}_{90}\text{In}_8\text{Ag}_2$ Glassy Alloy"*



Hatun Cinkaya of Boston College, presenting on *"Properties of White Light Generated by Near Infrared Excitation in Yttrium Silicates Undoped and Doped with Ytterbium"*



David Kraft of the University of Bridgeport presenting on *"Human Population Growth and the Mass of the Earth"*



Douglas Sweetser presenting on *"A Unified Mathematical Field Theory"*

Recap of Spring 2016 Meeting...Banquet

Right: John Collins introducing the Keynote Speaker at the banquet



Updates from Bridgewater State Univ. Physics

Bridgewater State University Physics

Physics Majors Presenting at Students Arts and Research Symposium (StARS) -2016

Applied – Astrophysics – Optics – Experimental – Undergraduate Research – Opportunity

Bridgewater State University Physics is a versatile and growing department making new and exciting strides in curriculum and research. Our faculty and staff work hard to provide exciting possibilities for you that will be extremely challenging but infinitely rewarding, to open up many opportunities for you after graduation. We currently have more than fifty Physics Majors, a handful of Physics Minors and several Master of Arts in Teaching (MAT) students. Most of our Majors take part in intensive and well-funded summer research programs in astrophysics, optics and biological physics. BSU physics graduates split roughly three ways after graduation, moving on to graduate school, teaching, or industry.

Why consider BSU Physics?

1. We offer a wide array of upper level physics courses – Special Relativity, Electrodynamics, Quantum Mechanics, Astrophysics, General Relativity, Particle Physics, Biophysics and more. Concentrations within the Physics major add specialization for your post-BSU plans: Applied Physics (stresses engineering aspects), Astrophysics and Optical Physics (geared to optics industries).

2. Our Experimental Lab's experiences are second to none – Modern Lab, Electronics Lab, Optics Lab, and Advanced Lab – and a student academic machine shop. You will work with tunable diode lasers, X-ray apparatus, a muon detector, photomultipliers, pulsed Nuclear Magnetic Resonance, optical tweezers, a lock-in amplifier, a research-grade observatory, a cluster computer and tons of discrete electrical components (analog, digital and microprocessor) and optical components.

3. We are housed in a state of the art teaching and research building with great teaching lab spaces and laboratories:

a. Laser Lab for Neutral Atom Trapping, Atomic/Molecular/Optical Physics

b. Biophysics Lab for DNA, Drug and Cancer studies with Optical Tweezers
c. Observatory with grade 14" telescope, high precision mount and CCD camera

d. Modern Physics Lab
e. Advanced Physics Lab
f. Theory & Astrophysics Lab
g. Physics Student Study Area
h. Academic Machine shop.

4. Our faculty are ready to challenge you in the classroom and through mentoring in research programs including: Atomic Physics (Magneto Optical Trap), Biophysics (Laser Tweezers), General Relativity and Gravitational Lensing, Particle Physics, Astrophysics (Exoplanets and Type Ia Supernovae) and much more.

5. Our faculty have won prestigious National grants for research and teaching pedagogies you can be part of, including the STREAMS and Noyce grants. Noyce offers scholarship opportunities for future science teachers.

6. Our faculty offers semester and summer grant opportunities through the Adrian Tinsley Program (ATP), the Massachusetts Space Grant Consortium (a division of NASA), and other organizations toward real experiences to prepare you for graduate school, industry and teaching and many other exciting futures, as well as possible publications.

7. Our department has formed pipelines to exciting opportunities such as paid internships at Plymouth Grating Labs, and had multiple students accepted to prestigious summer research programs (REUs) outside of BSU.

8. Our strong student community includes the active Society of Physics Students club, with speakers and field trips.

Physics Callouts:

- A Physics Major was a co-author re-

cently published and given "editors' Pick" in top General Relativity Professional Journal.

- Two recent graduates who worked in the Laser Lab are now working in MA based Optics Companies as Optical Engineers, one in research applications and the other in medical oncology.

- Physics majors have won prestigious National Undergraduate Research awards to speak on their BSU research at Harvard and in Washington DC.

- Over the past two summers, BSU Physics majors have won 4 prestigious NSF funded REUs to do summer research at Duke University/CERN, Kansas State, Indiana U. and Colgate U.

- Physics majors for past three years have won NASA Space grants and as part of the MASGC the BSU Experimental Astrophysics Research (BEAR) Team was established.

- Recent Physics Honors Theses have included research on: Particle Physics (Theory), General Relativity Gravitational Lensing (theory), and Biophysics (experiment).

Physics majors have gone on to earn Ph.D.s in Physics and Engineering, graduate degrees in medical fields and business, industry (including software), and teaching. Our department offers you the chance to build real-world experience, opening up possibilities for grad school (physics, engineering, med school, business), industry (biotech, computer science, optics, engineering), teaching and more.

If you have any questions or want to arrange a meeting please contact Dr. Edward Deveney at edeveney@bridgew.edu. We at the Bridgewater State physics department wish you success in your future endeavors!

Authors:

Jamie Kern and Ed Deveney

Observation of Multiple Activation in T_g of Se₉₀In₈Ag₂ Glassy Alloy

Abstract:

In the present study, multiple activation energy is reported for glass transition (T_g) of Se₉₀In₈Ag₂ glassy alloy during cooling. The T_g shows a linear relationship with cooling rates whereas the linearity of the transition follows three different linear trends for three different cooling ranges (a) low range - 5 °C/min to 20 °C/min, (b) medium range - 20 °C/min to 30 °C/min, and (c) high range - 30 °C/min to 50 °C/min. The activation energy is found to be positive for all three ranges and indicates that the Se₉₀In₈Ag₂ is a sensitive material to cooling rates and may bring the significance of being reused after multiple use of heating runs in memory devices.

Keywords: Activation Energy, Kinetics, calorimetry, cooling, heat flow, glass transition.

Introduction:

Chalcogenide glass (CG) is a glass containing one or more chalcogenide elements (not counting oxygen). These are three elements in Group 16 in the periodic table: sulfur, selenium and tellurium. The name chalcogenide originates from the Greek word "chalcos" meaning ore and "gen" meaning formation, thus the term chalcogenide is generally considered to mean ore former. [1] Such glasses are covalently bonded materials and may be classified as network solids; in effect, the entire glass matrix acts as an infinitely bonded molecule.

The modern technological applications of CGs are widespread. Examples include infrared detectors, moldable infrared optics such as lenses, and infrared optical fibers, with the main advantage being that these materials transmit across a wide range of the infrared electromagnetic spectrum. The physical properties of CGs (high refractive index, low phonon energy, high nonlinearity) also make them ideal for incorporation into lasers, planar optics, photonic integrated circuits, and other active devices especially if doped with rare earth ions. Many CGs exhibit several non-linear optical effects such as photon-induced refraction, [2] and electron-induced permittivity modification [3]. Some CGs experience thermally driven amorphous crystalline phase changes. This makes them useful for encoding binary information on thin films of CGs and forms the basis of rewritable optical discs [4] and non-volatile memory devices such as PRAM. A CD-RW (CD). Amorphous CGs form the basis of re-writable CD and DVD, solid-state memory technology. [4]

CGs show significant ionic transport that can be useful for data storage in a solid CG electrolyte. Our Interest is to test the effect of 2% Ag by weight in Se-In CG. Study the effect on Ag on its glass transition appearance. Study of glass transition kinetics and activation energy associated with it using calorimetric methods.

Experimental:

To prepare CG alloy of Se₉₀In₈Ag₂, high purity (99.999%) elements were purchased from "Nuclear Fuel Complex Manufacturers, India" weighed according to their respective atomic percentages. The alloy was prepared by rapid melt quenching technique. To achieve this, the materials were sealed in an evacuated quartz ampoule having dimensions of approximately 5 cm in length and 8 mm internal diameter. These ampoules were then heated up to a temperature of 800 °C at the rate of 3-4 °C per minute and kept at the same temperature for about 12 hours. For the preparation of homogeneous alloy, the ampoules were constantly rocked. Quenching was done in ice cooled water.

For calorimetric measurements, a small amount of material (5 mg) was taken and placed in MDSC 2920 instrument. It was then heated from 0 °C to 250 °C and cooled from 250 °C to 0 °C with a constant ramping rate of 20 °C/min. The experiment was repeated for different ramp rates varying from 5 °C/min to 50 °C/min for heating and cooling. Three transitions were observed. Glass transition as an endothermic peak, crystallization as an exothermic peak and melting transition as a large endothermic peak. Here we are focusing glass transition, T_g only.

Model and Theory Involved:

The kinetics of glass transition can be studied using Moynihan model [5]. Glass transition shows structural relaxation and can be studied in the form of activation energy of the transition from the calorimetric data. The data of the appearance of T_g is recorded as a function of ramp rates. The T_g is found to be shifted with ramp rates and shows the kinetics of the T_g in the

Observation of Multiple Activation in Tg of $\text{Se}_{90}\text{In}_8\text{Ag}_2$ Glassy Alloy

present glassy alloy.

The activation energy of molecular motion and rearrangement near glass transition temperature is calculated as a function of heating rate dependence of the glass transition temperature and is interpreted in terms of thermal relaxation phenomenon. Following Moynihan model, in the kinetic interpretation, the enthalpy at a particular temperature and time $H(T, t)$ of the glassy system, after an instantaneous isobaric change in temperature, relaxes isothermally towards a new equilibrium value $H_c(T)$. The relaxation equation can be written in the following form [6-7]:

$$\left(\frac{dH}{dt}\right)_T = -\frac{(H - H_c)}{\tau} \quad (1)$$

$$\tau = \tau_0 \exp\left(-\frac{\Delta E_g}{RT}\right) \exp[-C(H - H_c)] \quad (2)$$

Where τ_0 and C are constants and ΔE_g is the activation energy of relaxation time of glass transition.

$$\ln(\beta) = -\left(\frac{\Delta E_g}{R}\right)\left(\frac{1}{T_c}\right) + \ln(\beta_0) \quad (3)$$

Results:

Figure 1 shows heating and cooling of $\text{Se}_{90}\text{In}_8\text{Ag}_2$ alloy using calorimetric methods. Three peaks can be seen as glass transition, crystallization and melting on heating and nothing on cooling. Figure 2 shows the effect of cooling rate of sample and a shift in the Tg peak can be seen. To see clear effect on Tg, zoomed in plot is shown in the Figure 3. Following Moynihan model, activation energy can be calculated for Tg and shown in Figure 4 whereas the variation of Tg peak for different cooling rates is shown in Figure 5.

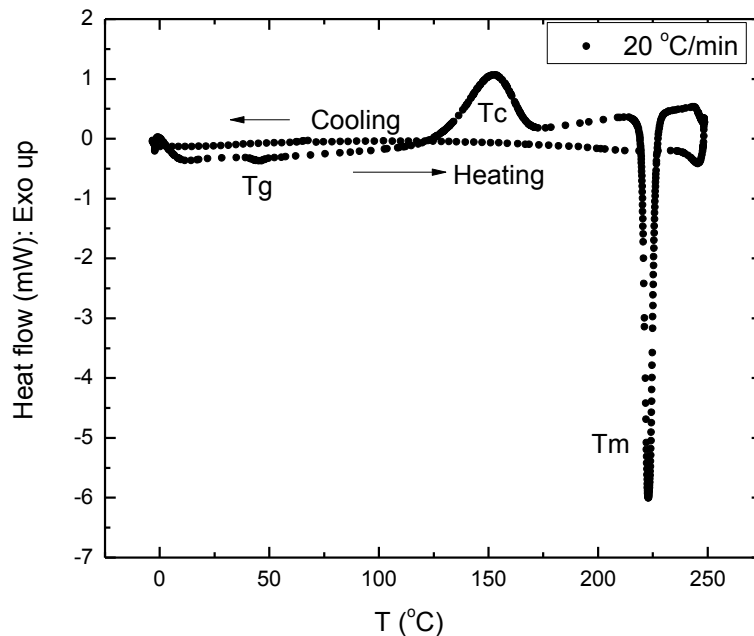


Figure 1: Heating and cooling of $\text{Se}_{90}\text{In}_8\text{Ag}_2$ at $20\text{°C}/\text{min}$ rate.

Recap of Winter 2016 CUW

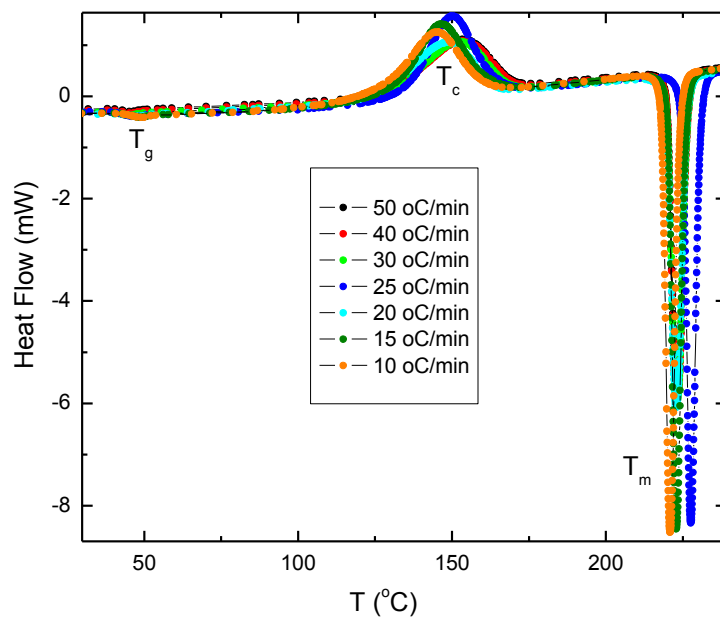


Figure 2: Effect of cooling rate on Se90In8Ag2.

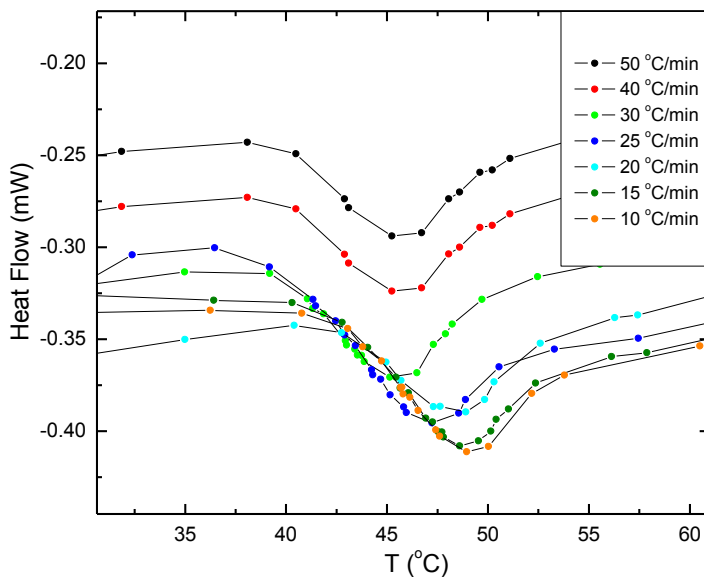


Figure 3: Effect of cooling rate on glass transition of Se90In8Ag2.

Observation of Multiple Activation in Tg of Se₉₀In₈Ag₂ Glassy Alloy

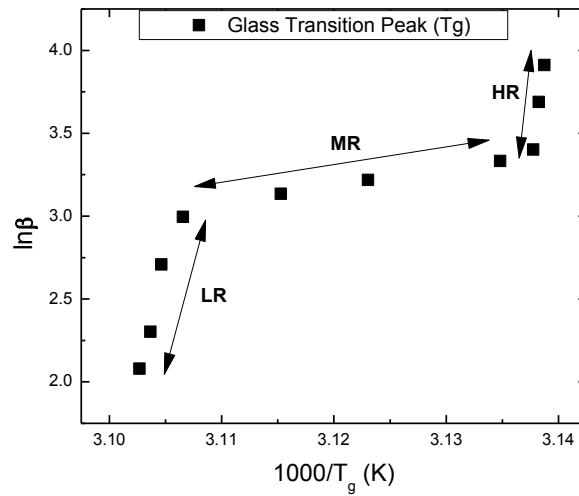
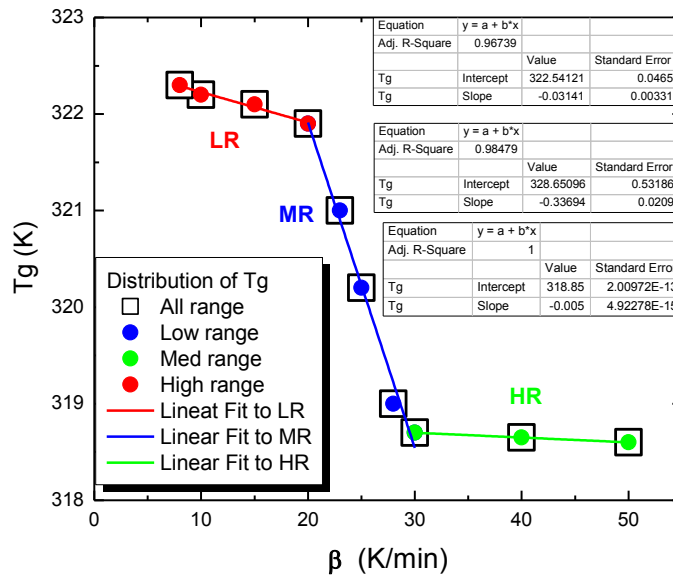


Figure 4: Activated kinetics of glass transition of Se90In8Ag2 following three different linear trends.



	ΔE	Ko
K/min	kJ/mol	Min-1
LR	-202.11	0
MR	-101.11	0
HR	-431.02	5.70E-73

Figure 5: Shifting of glass transition peak as a function of cooling rate shows three linear trend. Data table shows the activation energy (ΔE) and Y intercept (Ko) of each three linear trends representing three ranges of cooling.

Observation of Multiple Activation in Tg of $\text{Se}_{90}\text{In}_8\text{Ag}_2$ Glassy Alloy

Discussion and Conclusion:

Three different linear trends are observed for three different range of cooling ramp rates divided as (a) low range, (b) medium range, and (c) high range. These ranges are defined as low range for 5 oC/min to 20 oC/min, medium range for 20 oC/min to 30 oC/min and high range for 30 oC/min to 50 oC/min. These results follow "Moynihan model" and show the relaxation of molecules of $\text{Se}_{90}\text{In}_8\text{Ag}_2$ near the glass transition. It also shows that $\text{Se}_{90}\text{In}_8\text{Ag}_2$ alloy can be reused after multiple heating. Activation energy for Tg varies for three different ranges of ramp rates and found minimum for medium range and maximum for maximum range. More details are upcoming and can be seen in the next upcoming APS meetings.

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Presented in NESAPS spring 2016 meeting; (C2.00002)

Seeking co-editor for the New England Section Newsletter.

Dear APS New England Section Members,

The term of APS New England Section newsletter co-editor Ed Deveney is ending and he will be stepping down after our fall section meeting. We are seeking someone to take on this important role. The position is for a 3-year term.

The New England Section newsletter is published twice per year, coinciding with our two section meetings in the spring and fall. The co-editors are responsible for gathering articles of interest to our members for publication in the newsletter. This usually includes a review of the previous section meeting, and a preview for the upcoming meeting. They must also be able to coordinate and communicate effectively with the 2nd co-editor and NES APS.

The newsletter co-editors also serve as non-voting members of the Executive Committee of the section, attending the EC meetings which are held immediately following the scientific program at the spring and fall section meetings.

If you are interested in taking on this important role, please fill out the Statement of Interest at:

<https://goo.gl/forms/URlckFtT6fD8VdWm2>

If you would like further information about what the role would entail, please email Ed Deveney: edeveney@bridgew.edu.

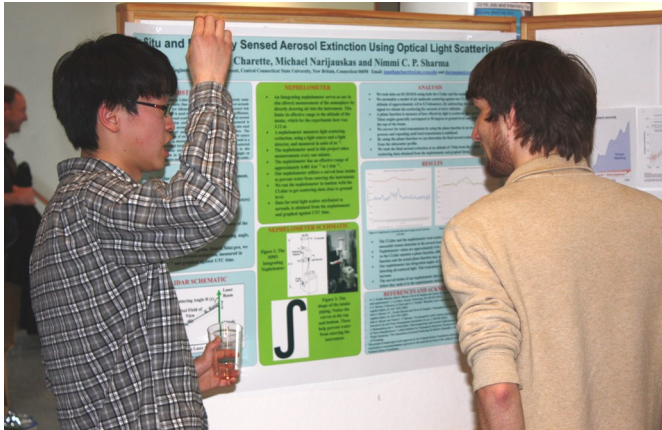
With thanks from the New England Section Executive Committee.

Do you have interesting Physics related articles, new programs, research report, physics talking points etc. that you will like to share with the New England Physics Community?

Send them to the co-editors:

Ed Deveney (edeveney@bridgew.edu), Peter LeMaire (lemaire@ccsu.edu)

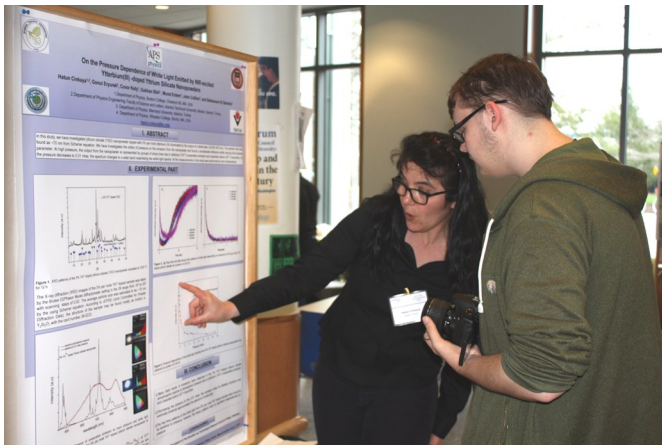
Recap of Spring 2016 Meeting...Poster Session



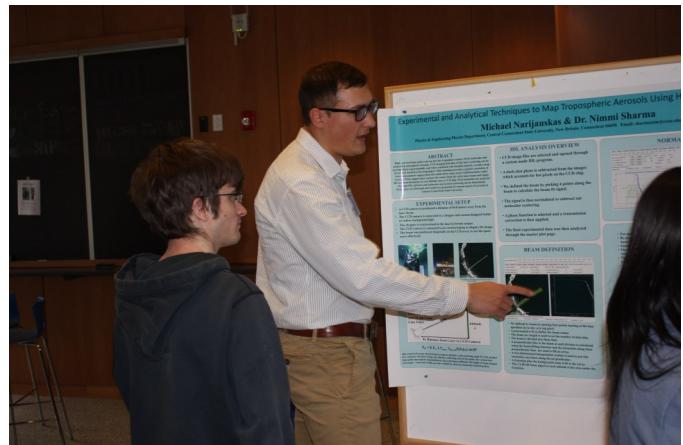
Jonathan Charette (left) of CCSU on "In Situ and Remotely Sensed Aerosol Extinction Using Optical Light Scattering"



Paul Carr (left) of AF Research Laboratory Emeritus on "Oceans: No Global Warming Hiatus"



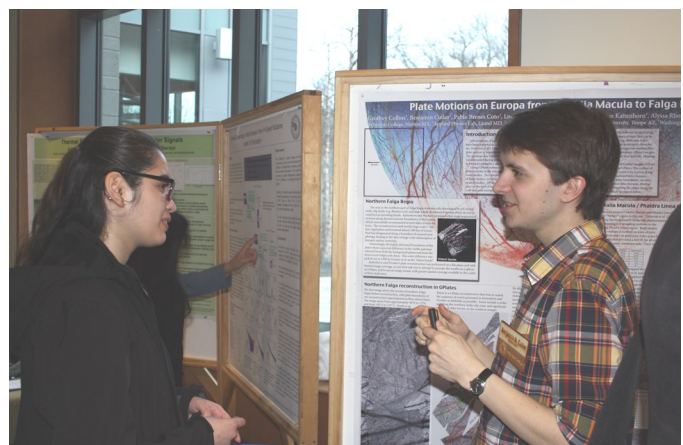
Hatun Cinkaya (left) of Boston College on "On the pressure dependence of white light emitted by NIR-excited Ytterbium (III) - doped Yttrium Silicate nanopowders"



Michael Narijauskas (right) of CCSU on "Experimental and Analytical Techniques to Map Tropospheric Aerosols Using High Powered Lasers"

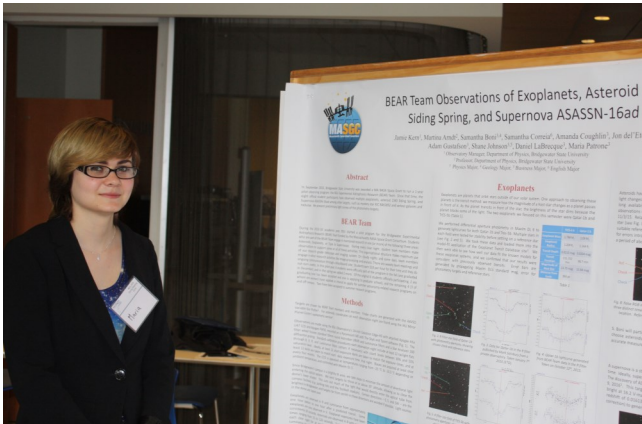


Samuel Chivoloni (right) of CCSU on "Process optimization for the synthesis of cathode materials for Li ion rechargeable batteries"

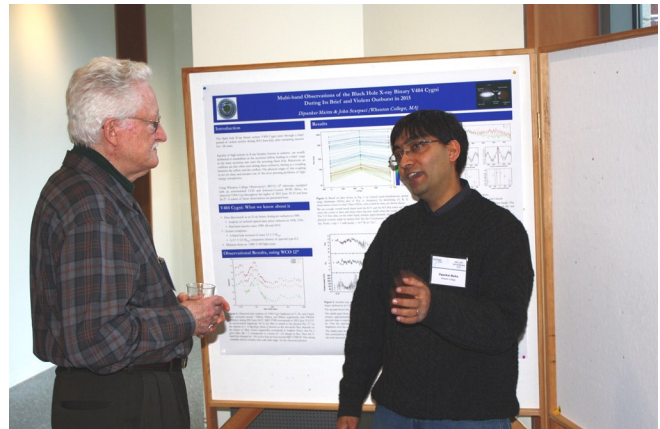


Benjamin Cutler (right) of Wheaton College on "Plate Motions on Europa from Castlia Macula to Falga Regio"

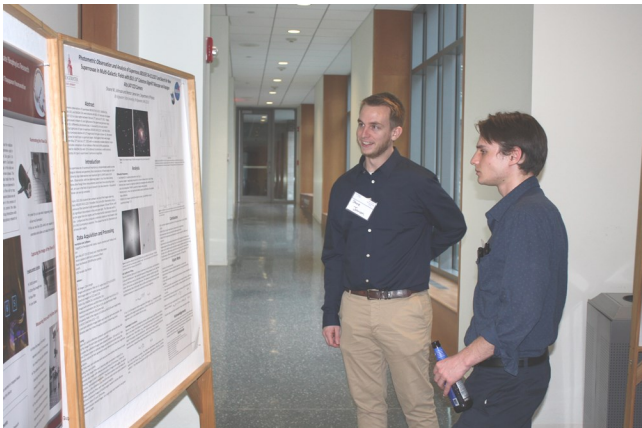
Recap of Spring 2016 Meeting...Poster Session



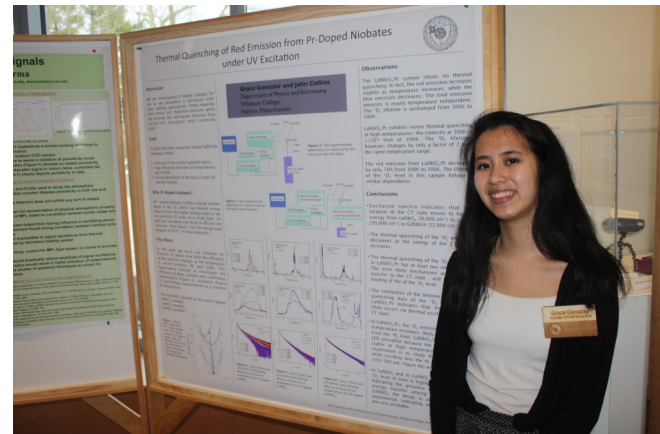
Maria Patrone of Bridgewater State University on “BEAR Team Observations of Exoplanets, Asteroid 2343 Siding Spring, and Supernova ASASSN-16ad1”



Dipankar Maitra (right) of Wheaton College on “Multi-band Observations of the Black Hole X-ray Binary V404 Cygni during its brief and violent outburst in 2015”



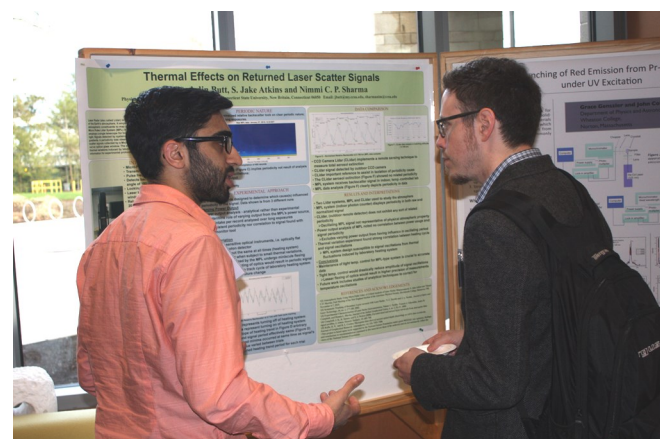
Shane Johnson (left) of Bridgewater State University on “Photometric Observation and Analysis of Supernova J081659.74+511233.7 and Search for New Supernovae in Multi-Galactic Fields with BSU's 14" Celestron Edge HD Telescope and Apogee Alta U47 CCD Camera”



Grace Genszler of Wheaton College on “Thermal Quenching of Red Emission from Pr-Doped Niobates under UV Excitation”



Seth David Ovits (right) of Princeton Plasma Physics Laboratory chats with **John Collins** (left) on “Sudden viscous dissipation in compressing plasma turbulence”



Jalal Butt (left) of CCSU on “Thermal Effects on Returned Laser Scatter Signals”

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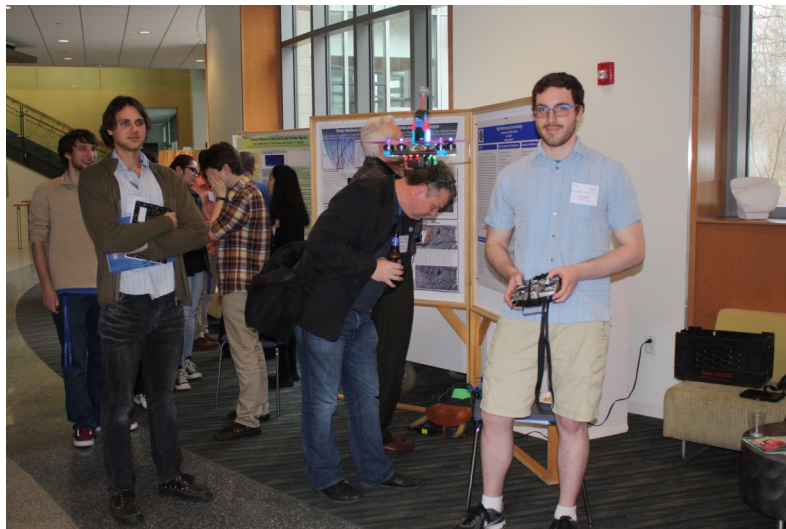
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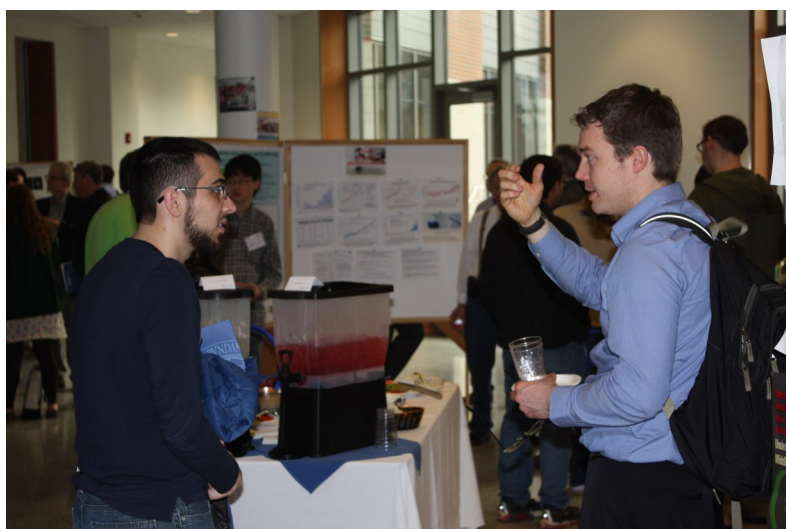
Recap of Spring 2016 Meeting...Poster Session



Zevi Rubin
of Wheaton College
demonstrates his
drone.



Ed Deveney (left),
APS-NES
Newsletter co-
editor chats with
Fred Martin at the
Poster session



Invited speaker
James Bird (right)
chats with CCSU
student **Daniel
Pereira** at the
poster session

Meeting photos courtesy of Peter K LeMaire

Contributions to this newsletter have not been peer-refereed. They represent solely the view(s) of the author(s) and not necessarily the views of APS.