

BIOLOGICAL SCIENCES

Deranieh, R. M., Shi, Y., Tarsio, M., Chen, Y., McCaffery, J. M., Kane, P. M., & Greenberg, M. L. (2015). Perturbation of the vacuolar ATPase: A novel consequence of inositol depletion. *Journal of Biological Chemistry*, 290(46), 27460-27472.

<http://proxy.lib.wayne.edu/login?url=http://www.scopus.com/inward/record.url?eid=2-s2.0-84946935178&partnerID=40&md5=9485ec5d7bf843590868f0b6643d3b89>.

Depletion of inositol has profound effects on cell function and has been implicated in the therapeutic effects of drugs used to treat epilepsy and bipolar disorder. We have previously shown that the anticonvulsant drug valproate (VPA) depletes inositol by inhibiting myo-inositol-3-phosphate synthase, the enzyme that catalyzes the first and rate-limiting step of inositol biosynthesis. To elucidate the cellular consequences of inositol depletion, we screened the yeast deletion collection for VPA-sensitive mutants and identified mutants in vacuolar sorting and the vacuolar ATPase (V-ATPase). Inositol depletion caused by starvation of *ino1Δ* cells perturbed the vacuolar structure and decreased V-ATPase activity and proton pumping in isolated vacuolar vesicles. VPA compromised the dynamics of phosphatidylinositol 3, 5-bisphosphate (PI3, 5P2) and greatly reduced V-ATPase proton transport in inositol-deprived wild-type cells. Osmotic stress, known to increase PI3, 5P2 levels, did not restore PI3, 5P2 homeostasis nor did it induce vacuolar fragmentation in VPA-treated cells, suggesting that perturbation of the V-ATPase is a consequence of altered PI3, 5P2 homeostasis under inositol-limiting conditions. This study is the first to demonstrate that inositol depletion caused by starvation of an inositol synthesis mutant or by the inositol-depleting drug VPA leads to perturbation of the V-ATPase. © 2015 by The American Society for Biochemistry and Molecular Biology, Inc.

CHEMISTRY

Fernando, R., Qu, C., Bowman, J. M., Field, R. W., & Suits, A. G. (2015). Does Infrared Multiphoton Dissociation of Vinyl Chloride Yield Cold Vinylidene? *Journal of Physical Chemistry Letters*, 6(13), 2457-2462.

<http://proxy.lib.wayne.edu/login?url=http://www.scopus.com/inward/record.url?eid=2-s2.0-84947587826&partnerID=40&md5=1464a1cd67edbf108e5a3ccf5b80a790>.

Velocity map imaging of the infrared multiphoton dissociation of vinyl chloride shows the formation of HCl in rotational levels below $J = 10$ that are associated with the three-center elimination pathway. The total translational energy release is observed to peak at 3-5 kcal/mol, which is consistent with the low reverse barrier predicted for the formation of HCl with vinylidene coproducts. Direct dynamics trajectory studies from the three-center transition state reproduce the observed distributions and show that the associated vinylidene is formed with only modest rotational excitation, precluding Coriolis-induced mixing among the excited vibrational levels of acetylene that would lead to distribution of vinylidene character into many vibrationally mixed acetylene vibrational levels. The results suggest that infrared multiphoton

dissociation of vinyl chloride is an efficient route to synthesis of stable, cold vinylidene. © 2015 American Chemical Society.

Fischer, J. L., Lutomski, C. A., El-Baba, T. J., Siriwardena-Mahanama, B. N., Weidner, S. M., Falkenhagen, J., . . . Trimpin, S. (2015). Matrix-Assisted Ionization-Ion Mobility Spectrometry-Mass Spectrometry: Selective Analysis of a Europium-PEG Complex in a Crude Mixture. *Journal of the American Society for Mass Spectrometry*, 26(12), 2086-2095.
<http://proxy.lib.wayne.edu/login?url=http://www.scopus.com/inward/record.url?eid=2-s2.0-84947608684&partnerID=40&md5=aa54e575fd2f8756930b09879d67598b>.

The analytical utility of a new and simple to use ionization method, matrix-assisted ionization (MAI), coupled with ion mobility spectrometry (IMS) and mass spectrometry (MS) is used to characterize a 2-armed europium(III)-containing poly(ethylene glycol) (Eu-PEG) complex directly from a crude sample. MAI was used with the matrix 1,2-dicyanobenzene, which affords low chemical background relative to matrix-assisted laser desorption/ionization (MALDI) and electrospray ionization (ESI). MAI provides high ion abundance of desired products in comparison to ESI and MALDI. Inductively coupled plasma-MS measurements were used to estimate a maximum of 10% of the crude sample by mass was the 2-arm Eu-PEG complex, supporting evidence of selective ionization of Eu-PEG complexes using the new MAI matrix, 1,2-dicyanobenzene. Multiply charged ions formed in MAI enhance the IMS gas-phase separation, especially relative to the singly charged ions observed with MALDI. Individual components are cleanly separated and readily identified, allowing characterization of the 2-arm Eu-PEG conjugate from a mixture of the 1-arm Eu-PEG complex and unreacted starting materials. Size-exclusion chromatography, liquid chromatography at critical conditions, MALDI-MS, ESI-MS, and ESI-IMS-MS had difficulties with this analysis, or failed. © 2015 American Society for Mass Spectrometry.

He, C. C., Kimutai, B., Bao, X., Hamlow, L., Zhu, Y., Strobehn, S. F., . . . Rodgers, M. T. (2015). Evaluation of Hybrid Theoretical Approaches for Structural Determination of a Glycine-Linked Cisplatin Derivative via Infrared Multiple Photon Dissociation (IRMPD) Action Spectroscopy. *Journal of Physical Chemistry A*, 119(44), 10980-10987.
<http://proxy.lib.wayne.edu/login?url=http://www.scopus.com/inward/record.url?eid=2-s2.0-84946615995&partnerID=40&md5=f1ff19a28dbf6f9b262b91e4f5c49caa>.

To gain a better understanding of the binding mechanism and assist in the optimization of chemical probing and drug design applications, experimental and theoretical studies of a series of amino acid-linked cisplatin derivatives are being pursued. Glyplatin (glycine-linked cisplatin) was chosen for its structural simplicity and to enable backbone effects to be separated from side-chain effects on the structure and reactivity of ornithine- and lysine-linked cisplatin (Ornplatin and Lysplatin, respectively). Infrared multiple photon dissociation (IRMPD) action spectroscopy experiments were performed on Glyplatin to characterize its structure and guide the selection of the most effective hybrid theoretical approach for determining its structure and IR spectrum. The simplicity of the Glyplatin system allows a wide variety of density functionals, treatments of the Pt center including the use of all-electron basis sets vs valence basis sets

combined with an effective core potential (ECP), and basis sets for all other atoms to be evaluated at a reasonable computational cost. The results for Glyplatin provide the foundation for calculations of more complex amino acid-linked cisplatin derivatives such as Ornplatin and Lysplatin. Present results suggest that the B3LYP/mDZP/def2-TZVP hybrid method can be effectively employed for structural and IR characterization of more complex amino acid-linked cisplatin complexes and their nucleic acid derivatives. © 2015 American Chemical Society.

Padige, G., Negmeldin, A. T., & Pflum, M. K. H. (2015). Development of an ELISA-based HDAC activity assay for characterization of isoform-selective inhibitors. *Journal of Biomolecular Screening*, 20(10), 1277-1285.

<http://proxy.lib.wayne.edu/login?url=http://www.scopus.com/inward/record.url?eid=2-s2.0-84948395602&partnerID=40&md5=f873b5cfcaab18cda4143eafc29593b0>.

Histone deacetylase (HDAC) proteins are promising targets for cancer treatment, with several HDAC inhibitors used clinically as anticancer drugs. Most HDAC inhibitors nonspecifically interact with all or many of the 11 HDAC isoforms. Isoform-selective HDAC inhibitors would be useful tools to dissect the individual functions of HDAC proteins in cancer formation, in addition to potentially displaying effective anticancer properties. We report here a robust HDAC activity assay for screening selective HDAC inhibitors, which is inspired by the traditional enzyme-linked immunosorbent assay (ELISA). The key feature of the ELISA-based HDAC activity assay is use of mammalian cell-derived HDAC isoforms instead of recombinant proteins. Importantly, the assay was validated with several known HDAC inhibitors. The ELISA-based HDAC activity assay will facilitate the characterization of isoform-selective HDAC inhibitors against mammalian cell-derived HDAC proteins, which will enhance HDAC-centered cancer research and provide a foundation for anticancer drug development. © 2015 Society for Laboratory Automation and Screening.

CRIMINAL JUSTICE

Donovan, K. M., & Klahm C.F, I. V. (2015). The Role of Entertainment Media in Perceptions of Police Use of Force. *Criminal Justice and Behavior*, 42(12), 1261-1281.

<http://proxy.lib.wayne.edu/login?url=http://www.scopus.com/inward/record.url?eid=2-s2.0-84946820849&partnerID=40&md5=f50c73bdea87ca49757cce8a52dcfd75>.

Scholars have long noted the importance of the media in shaping citizens' attitudes about crime and justice. Most studies have focused on the impact of news and particularly local TV news, yet Americans spend far more time watching entertainment media. We examine the portrayal of police misconduct in crime dramas, and how exposure to these portrayals affects perceptions of the police. We find that viewers of crime dramas are more likely to believe the police are successful at lowering crime, use force only when necessary, and that misconduct does not typically lead to false confessions. In contrast, perceptions regarding the frequency of force are unaffected. Our results add to a growing literature demonstrating the importance of entertainment media for attitudes toward crime and the criminal justice system. © 2015, 2015

International Association for Correctional and Forensic Psychology.

Johnson, R. R., Klahm, C. F., & Maddox, H. G. (2015). An Exploratory Analysis of Time Lapses in Serving Arrest Warrants: A Focal Concerns and Disproportionate Contact Approach. *Criminal Justice Review*, 40(4), 470-487.

<http://proxy.lib.wayne.edu/login?url=http://www.scopus.com/inward/record.url?eid=2-s2.0-84947440170&partnerID=40&md5=41decdb3452ef535faebe8278a6c7042>.

The seizure of persons through the authority of an arrest warrant issued by a magistrate is the only method of arrest specifically enumerated in the U.S. Constitution, yet scant research exists on the processing and serving of arrest warrants. This study investigated the correlates of how long it took a sample of arrest warrants to be served by law enforcement officials. Using focal concerns and disproportionate police contact underpinnings, the findings revealed the characteristics predictive of rapid service of warrants in this jurisdiction were weakly associated with the focal concerns perspective and generally unrelated to the disproportionate contact perspective. The findings highlight the need for more detailed study of, and the development of, better theoretical foundations for this issue. © 2015, © 2015 Georgia State University.

MATHEMATICS

Chow, P. L. (2016). Stochastic PDE model for spatial population growth in random environments. *Discrete and Continuous Dynamical Systems - Series B*, 21(1), 55-65.

<http://proxy.lib.wayne.edu/login?url=http://www.scopus.com/inward/record.url?eid=2-s2.0-84948683051&partnerID=40&md5=330d20602e28fe079a032c8ab243d337>.

The paper is concerned with a class of stochastic reaction-diffusion equations arising from a spatial population growth model in random environments. Under some sufficient conditions, Theorem 3.1 shows that the equation has a unique positive global solution in space $H^1(D)$. Then it is proven in Theorem 4.1 that the solution, as the population size, is ultimately bounded in the mean L^2 -norm as the time tends to infinity. An almost-sure upper bound is also obtained for the long run time-average of the exponential rate of the population growth in L^2 -norm together with the L^p -moment of the population size with $p \geq 2$. It is also shown in Theorem 4.3 that there is a unique invariant measure that leads to a stationary population distribution. For illustration, an example is given.

Colombo, G., Henrion, R., Nguyen, D. H., & Mordukhovich, B. S. (2015). Optimal control of the sweeping process over polyhedral controlled sets. *Journal of Differential Equations*.

<http://proxy.lib.wayne.edu/login?url=http://www.scopus.com/inward/record.url?eid=2-s2.0-84947329033&partnerID=40&md5=18d4e29be7b45ea537ba7ec2dc4804fc>.

The paper addresses a new class of optimal control problems governed by the dissipative and discontinuous differential inclusion of the sweeping/Moreau process while using controls to determine the best shape of moving convex polyhedra in order to optimize the given Bolza-type functional, which depends on control and state variables as well as their velocities. Besides the

highly non-Lipschitzian nature of the unbounded differential inclusion of the controlled sweeping process, the optimal control problems under consideration contain intrinsic state constraints of the inequality and equality types. All of this creates serious challenges for deriving necessary optimality conditions. We develop here the method of discrete approximations and combine it with advanced tools of first-order and second-order variational analysis and generalized differentiation. This approach allows us to establish constructive necessary optimality conditions for local minimizers of the controlled sweeping process expressed entirely in terms of the problem data under fairly unrestrictive assumptions. As a by-product of the developed approach, we prove the strong $W_{1,2}$ -convergence of optimal solutions of discrete approximations to a given local minimizer of the continuous-time system and derive necessary optimality conditions for the discrete counterparts. The established necessary optimality conditions for the sweeping process are illustrated by several examples. © 2015 Elsevier Inc.

Mordukhovich, B. S., & Nam, N. M. (2015). Geometric approach to convex subdifferential calculus. *Optimization*.

<http://proxy.lib.wayne.edu/login?url=http://www.scopus.com/inward/record.url?eid=2-s2.0-84946595137&partnerID=40&md5=360856e97935b2561a9f49eda08c8cb8>.

In this paper, we develop a geometric approach to convex subdifferential calculus in finite dimensions with employing some ideas of modern variational analysis. This approach allows us to obtain natural and rather easy proofs of basic results of convex subdifferential calculus in full generality and also derive new results of convex analysis concerning optimal value/marginal functions, normals to inverse images of sets under set-valued mappings, calculus rules for coderivatives of single-valued and set-valued mappings, and calculating coderivatives of solution maps to parameterized generalized equations governed by set-valued mappings with convex graphs. © 2015 Taylor & Francis

Mordukhovich, B. S., & Ouyang, W. (2015). Higher-order metric subregularity and its applications. *Journal of Global Optimization*, 63(4), 777-795.

<http://proxy.lib.wayne.edu/login?url=http://www.scopus.com/inward/record.url?eid=2-s2.0-84947486039&partnerID=40&md5=df5fa33e99314d53ce684135e4557d20>.

This paper is devoted to the study of metric subregularity and strong subregularity of any positive order q for set-valued mappings in finite and infinite dimensions. While these notions have been studied and applied earlier for $q=1$ and—to a much lesser extent—for (Formula presented.), no results are available for the case (Formula presented.). We derive characterizations of these notions for subgradient mappings, develop their sensitivity analysis under small perturbations, and provide applications to the convergence rate of Newton-type methods for solving generalized equations. © 2015, Springer Science+Business Media New York.

Mordukhovich, B. S., & Wang, D. (2015). Optimal Control of Semilinear Unbounded Evolution Inclusions with Functional Constraints. *Journal of Optimization Theory and Applications*, 167(3), 821-841.

<http://proxy.lib.wayne.edu/login?url=http://www.scopus.com/inward/record.url?eid=2-s2.0-84947485943&partnerID=40&md5=5c9be1f2f148c0661fb332ed12979509>.

This paper is devoted to the study of a Mayer-type optimal control problem for semilinear unbounded evolution inclusions in reflexive and separable Banach spaces subject to endpoint constraints described by finitely many Lipschitzian equalities and inequalities. First we construct a sequence of discrete approximations to the optimal control problem for evolution inclusions and prove that optimal solutions to discrete approximation problems uniformly converge to a given optimal solution for the original continuous-time problem. Then, based on advanced tools of variational analysis and generalized differentiation, we derive necessary optimality conditions for discrete-time problems under fairly general assumptions. Combining these results with recent achievements of variational analysis in infinite-dimensional spaces, we establish new necessary optimality conditions for continuous-time evolution inclusions by passing to the limit from discrete approximations. © 2014, Springer Science+Business Media New York.

PHYSICS

The ALICE Collaboration (2015). Coherent $\psi(2S)$ photo-production in ultra-peripheral PbPb collisions at $\sqrt{s_{NN}}=2.76$ TeV. *Physics Letters, Section B: Nuclear, Elementary Particle and High-Energy Physics*, 751, 358-370.

<http://proxy.lib.wayne.edu/login?url=http://www.scopus.com/inward/record.url?eid=2-s2.0-84946562450&partnerID=40&md5=a55a193feedacdd31761b187d1e9680b>.

We have performed the first measurement of the coherent $\psi(2S)$ photo-production cross section in ultra-peripheral Pb-Pb collisions at the LHC. This charmonium excited state is reconstructed via the $\psi(2S) \rightarrow l+l-$ and $\psi(2S) \rightarrow J/\psi \pi^+\pi^-$ decays, where the J/ψ decays into two leptons. The analysis is based on an event sample corresponding to an integrated luminosity of about $22 \mu\text{b}^{-1}$. The cross section for coherent $\psi(2S)$ production in the rapidity interval $-0.9 < y < 0.9$ is $d\sigma\psi(2S)_{\text{coh}}/dy = 0.83 \pm 0.19(\text{stat} + \text{syst})$ mb. The $\psi(2S)$ to J/ψ coherent cross section ratio is $0.34 - 0.07 + 0.08(\text{stat} + \text{syst})$. The obtained results are compared to predictions from theoretical models. © 2015 CERN for the benefit of the ALICE Collaboration.

The ALICE Collaboration (2015). One-dimensional pion, kaon, and proton femtoscopy in Pb-Pb collisions at $\sqrt{s_{NN}} = 2.76$ TeV. *Physical Review C - Nuclear Physics*, 92(5).

<http://proxy.lib.wayne.edu/login?url=http://www.scopus.com/inward/record.url?eid=2-s2.0-84948675616&partnerID=40&md5=179bae497cde2c5ebe681b9f391cf226>.

The size of the particle emission region in high-energy collisions can be deduced using the femtoscopic correlations of particle pairs at low relative momentum. Such correlations arise due to quantum statistics and Coulomb and strong final state interactions. In this paper, results are presented from femtoscopic analyses of $\pi^+\pi^+$, K^+K^+ , K^0K^0 , pp , and p^-p^- correlations from Pb-

Pb collisions at $\sqrt{s_{NN}}=2.76$ TeV by the ALICE experiment at the LHC. One-dimensional radii of the system are extracted from correlation functions in terms of the invariant momentum difference of the pair. The comparison of the measured radii with the predictions from a hydrokinetic model is discussed. The pion and kaon source radii display a monotonic decrease with increasing average pair transverse mass m_T which is consistent with hydrodynamic model predictions for central collisions. The kaon and proton source sizes can be reasonably described by approximate m_T scaling. Published by the American Physical Society under the terms of the Creative Commons Attribution 3.0 License. Further distribution of this work must maintain attribution to the author(s) and the published article's title, journal citation, and DOI. © 2015 CERN.

The CMS Collaboration (2015). Comparison of the $Z/\gamma^* + \text{jets}$ to $\gamma + \text{jets}$ cross sections in pp collisions at (Formula presented.) TeV. *Journal of High Energy Physics*, 2015(10), 1-46.

<http://proxy.lib.wayne.edu/login?url=http://www.scopus.com/inward/record.url?eid=2-s2.0-84946541351&partnerID=40&md5=7cd3b77c5e498ba8f7635f410fc9b65c>.

Abstract: A comparison of the differential cross sections for the processes $Z/\gamma^* + \text{jets}$ and photon (γ)+jets is presented. The measurements are based on data collected with the CMS detector at $\sqrt{s}=8$ (Formula presented.) TeV corresponding to an integrated luminosity of 19.7 fb^{-1} . The differential cross sections and their ratios are presented as functions of p_T . The measurements are also shown as functions of the jet multiplicity. Differential cross sections are obtained as functions of the ratio of the Z/γ^*p_T to the sum of all jet transverse momenta and of the ratio of the Z/γ^*p_T to the leading jet transverse momentum. The data are corrected for detector effects and are compared to simulations based on several QCD calculations.[Figure not available: see fulltext.] © 2015, The Author(s).

The CMS Collaboration (2015). Search for a charged Higgs boson in pp collisions at $\sqrt{s} = 8$ TeV. *Journal of High Energy Physics*, 2015(11), 1-64.

<http://proxy.lib.wayne.edu/login?url=http://www.scopus.com/inward/record.url?eid=2-s2.0-84947281259&partnerID=40&md5=f70c5248723155c4a339b139a8a6f222>.

A search for a charged Higgs boson is performed with a data sample corresponding to an integrated luminosity of $19.7 \pm 0.5 \text{ fb}^{-1}$ collected with the CMS detector in proton-proton collisions at $\sqrt{s} = 8, \text{ TeV}$. The charged Higgs boson is searched for in top quark decays for $m_{H^\pm} < m_t - m_b$, and in the direct production $pp \rightarrow t(b)H^\pm$ for $m_{H^\pm} > m_t - m_b$. The $H^\pm \rightarrow \tau^\pm \nu_\tau$ and $H^\pm \rightarrow tb$ decay modes in the final states $\tau h + \text{jets}$, $\mu \tau h$, $\ell + \text{jets}$, and $\ell \ell'$ ($\ell = e, \mu$) are considered in the search. No signal is observed and 95% confidence level upper limits are set on the charged Higgs boson production. A model-independent upper limit on the product branching fraction (Formula presented.) is obtained in the mass range $m_{H^\pm} = 80\text{--}160 \text{ GeV}$, while the upper limit on the cross section times branching fraction (Formula presented.) is set in the mass range $m_{H^\pm} = 180\text{--}600 \text{ GeV}$. Here, $\sigma(pp \rightarrow t(b)H^\pm)$ stands for the cross section sum (Formula presented.), an upper limit on $\sigma(pp \rightarrow t(b)H^\pm)$ of $2.0\text{--}0.13 \text{ pb}$ is set for $m_{H^\pm} = 180\text{--}600 \text{ GeV}$. The combination of all considered decay modes and final states is used to set exclusion limits in the $m_{H^\pm} - \tan \beta$ parameter space in different MSSM benchmark scenarios. © 2015, The Author(s).

The CMS Collaboration (2015). Search for neutral MSSM Higgs bosons decaying into a pair of bottom quarks. *Journal of High Energy Physics*, 2015(11), 1-43.

<http://proxy.lib.wayne.edu/login?url=http://www.scopus.com/inward/record.url?eid=2-s2.0-84947759580&partnerID=40&md5=545c19571f2e21e0699b3f9fac0c6ffb>.

Abstract: A search for neutral Higgs bosons decaying into a $b\bar{b}$ quark pair and produced in association with at least one additional b quark is presented. This signature is sensitive to the Higgs sector of the minimal supersymmetric standard model (MSSM) with large values of the parameter $\tan\beta$. The analysis is based on data from proton-proton collisions at a center-of-mass energy of 8 TeV collected with the CMS detector at the LHC, corresponding to an integrated luminosity of 19.7 fb⁻¹. The results are combined with a previous analysis based on 7 TeV data. No signal is observed. Stringent upper limits on the cross section times branching fraction are derived for Higgs bosons with masses up to 900 GeV, and the results are interpreted within different MSSM benchmark scenarios, mh max, mh mod +, mh mod -, light-stau and light-stop. Observed 95% confidence level upper limits on $\tan\beta$, ranging from 14 to 50, are obtained in the mh mod + benchmark scenario. [Figure not available: see fulltext.] © 2015, The Author(s).

The CMS Collaboration (2015). Measurements of the ZZ production cross sections in the 2l2ν channel in proton–proton collisions at $\sqrt{s} = 7$ and 8 TeV and combined constraints on triple gauge couplings. *European Physical Journal C*, 75(10), 1-26.

<http://proxy.lib.wayne.edu/login?url=http://www.scopus.com/inward/record.url?eid=2-s2.0-84946548624&partnerID=40&md5=f9281065ce7742b3f0626bf312faa5a7>.

Measurements of the ZZ production cross sections in proton–proton collisions at center-of-mass energies of 7 and 8 TeV are presented. Candidate events for the leptonic decay mode $ZZ \rightarrow 2l2\nu$, where l denotes an electron or a muon, are reconstructed and selected from data corresponding to an integrated luminosity of 5.1 (19.6)fb⁻¹ at 7 (8)TeV collected with the CMS experiment. The measured cross sections, (Formula presented.), are in good agreement with the standard model predictions with next-to-leading-order accuracy. The selected data are analyzed to search for anomalous triple gauge couplings involving the ZZ final state. In the absence of any deviation from the standard model predictions, limits are set on the relevant parameters. These limits are then combined with the previously published CMS results for ZZ in 4l final states, yielding the most stringent constraints on the anomalous couplings. © 2015, CERN for the benefit of the CMS collaboration.

Hong, T., Chamlagain, B., Wang, T., Chuang, H. J., Zhou, Z., & Xu, Y. Q. (2015). Anisotropic photocurrent response at black phosphorus-MoS2 p-n heterojunctions. *Nanoscale*, 7(44), 18537-18541.

<http://proxy.lib.wayne.edu/login?url=http://www.scopus.com/inward/record.url?eid=2-s2.0-84946882136&partnerID=40&md5=01567cd080c4e9935e5bb5cdb5ef9010>.

We investigate the photocurrent generation mechanisms at a vertical p-n heterojunction between black phosphorus (BP) and molybdenum disulfide (MoS2) flakes through polarization-, wavelength-, and gate-dependent scanning photocurrent measurements. When incident photon

energy is above the direct band gap of MoS₂, the photocurrent response demonstrates a competitive effect between MoS₂ and BP in the junction region. In contrast, if the incident photon energy is below the band gap of MoS₂ but above the band gap of BP, the photocurrent response at the p-n junction exhibits the same polarization dependence as that at the BP-metal junction, which is nearly parallel to the MoS₂ channel. This result indicates that the photocurrent signals at the MoS₂-BP junction primarily result from the direct band gap transition in BP. These fundamental studies shed light on the knowledge of photocurrent generation mechanisms in vertical 2D semiconductor heterojunctions, offering a new way of engineering future two-dimensional materials based optoelectronic devices. © 2015 The Royal Society of Chemistry.

Khodjamirian, A., Mannel, T., & Petrov, A. A. (2015). Direct probes of flavor-changing neutral currents in e^+e^- -collisions. *Journal of High Energy Physics*, 2015(11), 1-21.

<http://proxy.lib.wayne.edu/login?url=http://www.scopus.com/inward/record.url?eid=2-s2.0-84948407086&partnerID=40&md5=a0042b402717e586297e47953fa8b1d6>.

Abstract: We propose a novel method to study flavor-changing neutral currents in the $e^+e^- \rightarrow D^*0$ and $e^+e^- \rightarrow Bs^*$ transitions, tuning the energy of e^+e^- collisions to the mass of the narrow vector resonance D^*0 or Bs^* . We present a thorough study of both short-distance and long-distance contributions to $e^+e^- \rightarrow D^*0$ in the Standard Model and investigate possible contributions of new physics in the charm sector. This process, albeit very rare, has clear advantages with respect to the $D^0 \rightarrow e^+e^-$ decay: the helicity suppression is absent, and a richer set of effective operators can be probed. Implications of the same proposal for Bs^* are also discussed. © 2015, The Author(s).

Shrestha, U. R., Bhowmik, D., Copley, J. R. D., Tyagi, M., Leão, J. B., & Chu, X. Q. (2015). Effects of pressure on the dynamics of an oligomeric protein from deep-sea hyperthermophile. *Proceedings of the National Academy of Sciences of the United States of America*, 112(45), 13886-13891.

<http://proxy.lib.wayne.edu/login?url=http://www.scopus.com/inward/record.url?eid=2-s2.0-84946780138&partnerID=40&md5=163ecabe7d1148efb7a8d56d98de8431>.

Inorganic pyrophosphatase (IPPase) from *Thermococcus thioautotrophicus* is a large oligomeric protein derived from a hyperthermophilic microorganism that is found near hydrothermal vents deep under the sea, where the pressure is up to 100 MPa (1 kbar). It has attracted great interest in biophysical research because of its high activity under extreme conditions in the seabed. In this study, we use the quasielastic neutron scattering (QENS) technique to investigate the effects of pressure on the conformational flexibility and relaxation dynamics of IPPase over a wide temperature range. The β -relaxation dynamics of proteins was studied in the time ranges from 2 to 25 ps, and from 100 ps to 2 ns, using two spectrometers. Our results indicate that, under a pressure of 100 MPa, close to that of the native environment deep under the sea, IPPase displays much faster relaxation dynamics than a mesophilic model protein, hen egg white lysozyme (HEWL), at all measured temperatures, opposite to what we observed previously under ambient pressure. This contradictory observation provides evidence that the protein energy landscape is distorted by high pressure, which is significantly different for hyperthermophilic

(IPPase) and mesophilic (HEWL) proteins. We further derive from our observations a schematic denaturation phase diagram together with energy landscapes for the two very different proteins, which can be used as a general picture to understand the dynamical properties of thermophilic proteins under pressure.

The STAR Collaboration (2015). Measurement of interaction between antiprotons. *Nature*, 527(7578), 345-348.

<http://proxy.lib.wayne.edu/login?url=http://www.scopus.com/inward/record.url?eid=2-s2.0-84947714738&partnerID=40&md5=27b9effa610b577fb87c353aed825fc1>.

One of the primary goals of nuclear physics is to understand the force between nucleons, which is a necessary step for understanding the structure of nuclei and how nuclei interact with each other. Rutherford discovered the atomic nucleus in 1911, and the large body of knowledge about the nuclear force that has since been acquired was derived from studies made on nucleons or nuclei. Although antinuclei up to antihelium-4 have been discovered and their masses measured, little is known directly about the nuclear force between antinucleons. Here, we study antiproton pair correlations among data collected by the STAR experiment at the Relativistic Heavy Ion Collider (RHIC), where gold ions are collided with a centre-of-mass energy of 200 gigaelectronvolts per nucleon pair. Antiprotons are abundantly produced in such collisions, thus making it feasible to study details of the antiproton-antiproton interaction. By applying a technique similar to Hanbury Brown and Twiss intensity interferometry, we show that the force between two antiprotons is attractive. In addition, we report two key parameters that characterize the corresponding strong interaction: the scattering length and the effective range of the interaction. Our measured parameters are consistent within errors with the corresponding values for proton-proton interactions. Our results provide direct information on the interaction between two antiprotons, one of the simplest systems of antinucleons, and so are fundamental to understanding the structure of more-complex antinuclei and their properties. © 2015 Macmillan Publishers Limited. All rights reserved.

PSYCHOLOGY

Kott, J. M., Mooney-Leber, S. M., Shoubah, F. A., & Brummelte, S. (2016). Effectiveness of different corticosterone administration methods to elevate corticosterone serum levels, induce depressive-like behavior, and affect neurogenesis levels in female rats. *Neuroscience*, 312, 201-214.

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High levels of chronic stress or stress hormones are associated with depressive-like behavior in animal models. However, slight elevations in corticosterone (CORT) - the major stress hormone in rodents - have also been associated with improved performances, albeit in a sex-dependent manner. Some of the discrepancies in the literature regarding the effects of high CORT levels may be due to different administrations methods. The current study aims to compare the effects

of ~40. mg/kg given either via subcutaneous injection, through an implanted pellet, or in the drinking water, for ~21. days on CORT serum levels, depressive-like behavior in the forced swim test (FST), and neurogenesis levels in the dentate gyrus (DG) in adult female rats. We found that animals exposed to the daily injections showed elevated CORT levels throughout the administration period, while the pellet animals showed only a transient increase, and drinking water animals revealed no elevation in CORT in serum. In addition, only the injection group exhibited higher levels of immobility in the FST. Interestingly, animals receiving CORT via injection or drinking water had lower numbers of doublecortin-positive cells in the ventral DG one week after the last CORT administration compared to animals implanted with a CORT pellet. These results will contribute to the growing literature on the effects of chronic CORT exposure and may help to clarify some of the discrepancies among previous studies, particularly in females. © 2015 IBRO.

McLear, C., Trentacosta, C. J., & Smith-Darden, J. (2015). Child Self-Regulation, Parental Secure Base Scripts, and At-Risk Kindergartners' Academic Achievement. *Early Education and Development*, 1-17.

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Research Findings: Early reading and mathematics skills predict later academic success, and child self-regulation and secure parent-child relationships are both predictors of early academic skills. Self-regulatory and family relationship factors have rarely been studied together as predictors of early academic success in populations of young children at risk for academic difficulties. This study examined child self-regulation and parents' representations of parent-child relationships as predictors of young children's academic achievement. Participants were 106 kindergartners attending charter schools that served impoverished neighborhoods in a large city. In a path analysis, child self-regulation and parental secure base script scores each uniquely predicted kindergartners' academic achievement at the end of the school year when several key covariates were accounted for. Practice or Policy: Children's self-regulation skills should be assessed at school entry to help identify the children at greatest risk for academic difficulties. The findings also provide further support for programs that promote healthy parent-child relationships and self-regulation prior to school entry. © 2015 Taylor & Francis

URBAN PLANNING

Pothukuchi, K. (2015). Five Decades of Community Food Planning in Detroit: City and Grassroots, Growth and Equity. *Journal of Planning Education and Research*, 35(4), 419-434. <http://proxy.lib.wayne.edu/login?url=http://www.scopus.com/inward/record.url?eid=2-s2.0-84947218234&partnerID=40&md5=a013703384f065172453d7e97f7010c7>.

Food planning in Detroit has matured over the last fifteen years, but it is not without links to past food-related initiatives or broader planning in response to the city's decline over five decades. Occurring mostly in community networks, it encompasses a greater variety of activities

than that sponsored by public or quasi-public agencies. Because of food planning's links to place and politics, the continuity of institutional structures and their logics, and the persistence of socioeconomic conditions, it is crucial to understand food planning in historical context and as a specific response to the conditions faced by the community. The article investigates city- and grassroots-sponsored food planning over fifty years, and discusses the implications of each for a just food system in the city. © 2015, © The Author(s) 2015.