DEPARTMENT OF PHYSICS AND ASTRONOMY

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UPCOMING EVENT

On Jan. 28, 7 PM at the *Lawrence Public Library* Auditorium, Profs. **Baringer** and **Melott** will be part of a panel on the novel *The Martian*, which has been chosen as the book for “Read across Lawrence” in 2016.

OUT AND ABOUT

Prof. Feldman gave an invited talk “Funny Thing Happened on the Way to Convergence” in the workshop "Cosmic Flows (and Other Novelties on Large Scales)” at the *Perimeter Institute for Theoretical* Physics in Waterloo, Ontario, Canada on August 10, 2015.

Prof. Feldman gave a colloquium at Kansas State University on November 30, 2015. He gave two public lectures “What Do We Know and How Do We Know It", at the *Science Cafe in Topeka* on October 13 and *Science on Tap* at the Free State Brewery in Lawrence on October 20.

Prof. Steve Hawley was an invited speaker at several events during this period. In September he was the featured presenter for the *KU Alumni Association* event at Space Center Houston. He was also an invited participant in a panel at *UC Santa Cruz* with astrophysicists and fellow UCSC alumni Doug Duncan and Geoff Marcy. In October, Prof. Hawley gave the keynote address at the *Toastmasters International* convention in Topeka and a colloquium at *KU Aerospace Engineering*. In November, Prof. Hawley was part of an invited panel at *Kennedy Space Center* to discuss the history of launch and servicing of the Hubble Space Telescope.

Prof. Kong gave an invited talk, entitled by “Looking for Resonances under the LHC Lamppost” at a workshop, Non-conventional searches at the LHC (December 14-18, 2015) at the *Center for Theoretical Physics of the Universe*, Institute for Basic Science, Korea. He also gave a three-hour long lecture on special relativity for high school students in Korea on the 19th.

Prof. Melott's research was the subject of a KU press release on the topic of resolving some inconsistencies in the widely used "molecular clocks" that track evolution. The release, which was picked up broadly, can be seen at http://news.ku.edu/2015/11/18/factoring-cosmic-radiation-could-help-set-more-accurate-molecular-clock .

Theory student **Gopolang Mohlabeng** gave a chalk talk on "Boosted Dark Matter" at the *University of Chicago* on October 2015. He also gave an invited talk on "MadDM v2.0: Dark Matter observables in MadGraph 5" at the 2015 US *LHC Users Association Meeting* (USLUA), *Fermilab* (November 13, 2015). He is one of the *13 USLUA 2015 Lightning Round Winners* and is invited to 2016 HEP trip to Washington DC, where they meet with members of *Congress* and their staff, key committees and representatives of the DOE and NSF, to talk about particle physics and his research. He was also interviewed by *KCUR* on November 18 on his research. The interview is available from this link: http://kcur.org/post/space-and-spaces Gopi's story on his Fermilab fellowship can be found from KU today web page: https://news.ku.edu/2015/11/05/dark-matter-research-earns-doctoral-student-fellowship-fermilab

Gregory Rudnick spent the fall semester on sabbatical working at the Max-Planck-Institute for Extraterrestrial Physics in Garching, Germany. While there he has been working on the properties of gas in distant galaxies in dense environments.

In September 2015, **Gregory** gave an invited review talk at the conference "In the footsteps of Galaxies: Tracing the Evolution of Environmental Effects", located in Soverato, Italy. The title of his talk was "The gas in galaxies and how it is affected by environment". He also organized a week-long workshop at the International Space Sciences Institute in Bern, Switzerland. The title of the workshop was "The Effect of Dense Environments on Gas in Galaxies over 10 Billion Years of Cosmic Time". In November 2015, **Prof. Rudnick** gave an invited presentation at the conference "3DHST: Census, Evolution, Physics" located at Yale University.

In October 2015, **Gregory** gave an invited colloquium at the *University of Munich Observatory*, entitled "The life cycle of galaxies in clusters over 10 billion years". In November, he gave a seminar at *Leiden Observatory* in the Netherlands entitled "The molecular gas properties of galaxies in a distant cluster".

RECENT PUBLICATIONS

Chui-Ping Yang , Qi-Ping Su , Shi-Biao Zheng, and **Siyuan Han**, One-step transfer or exchange of arbitrary multipartite quantum states with a single-qubit coupler, *Phys. Rev. B 92*, 054509 (2015). [http://dx.doi.org/10.1103/PhysRevB.92.054509]

Guozhu Sun, Jiquan Zhai, Xueda Wen, Yang Yu, Lin Kang, Weiwei Xu, Jian Chen, Peiheng Wu, and **Siyuan Han**, Detection of small single-cycle signals by stochastic resonance using a bistable superconducting quantum interference device, *Appl. Phys. Lett. 106*, 172602 (2015). [http://dx.doi.org/10.1063/1.4919539]

Guozhu Sun, Xueda Wen, Ming Gong, Danwei Zhang, Yang Yu, Shiliang Zhu, Jian Chen, Peiheng Wu, and **Siyuan Han**, Observation of coherent oscillation in single-passage Landau-Zener transitions, *Sci. Rep., 5*, 8463 (2015). doi:10.1038/srep08463

D. V. Averin, K. Xu, Y. P. Zhong, C. Song, H. Wang, and **Siyuan Han**, Suppression of dephasing by qubit motion in superconducting circuits, *Phys. Rev. Lett.* 116, 010501 (2016). DOI: 10.1103/PhysRevLett.116.010501

Xinsheng Tan, Haifeng Yu, Yang Yu, and **Siyuan Han**, Rapid characterization of microscopic two-level systems using Landau-Zener transitions in a superconducting qubit, *Appl. Phys. Lett.* 107, 102601 (2015). [http://dx.doi.org/10.1063/1.4930201]

Guozhu Sun, Jiquan Zhai, Xueda Wen, Yang Yu, Lin Kang, Weiwei Xu, Jian Chen, Peiheng Wu, and **Siyuan Han**, Detection of small single-cycle signals by stochastic resonance using a bistable superconducting quantum interference device, *Appl. Phys. Lett*. 106, 172602 (2015). [http://dx.doi.org/10.1063/1.4919539]

Shi-Biao Zheng, You-Peng Zhong, Kai Xu, Qi-Jue Wang, H. Wang, Li-Tuo Shen, Chui-Ping Yang, John M. Martinis, A. N. Cleland, and **Siyuan Han**, Quantum Delayed-Choice Experiment with a Beam Splitter in a Quantum Superposition, *Phys. Rev. Lett.* 115, 260403 (2015). DOI: 10.1103/PhysRevLett.115.260403

Steven A. Hawley, Hubble Space Telescope Solar Array Concerns and Consequences for Servicing Mission 2, *Journal of Spacecraft and Rockets*, (2015), doi:10.2514/1.A33388

Diboson Excesses Demystified in Effective Field Theory Approach, Hyun Min Lee, Doojin Kim, **Kyoungchul Kong**, Seong Chan Park, *Journal of High Energy Physics* 1511 (2015) 150

Direct Detection of Dark Matter with MadDM v.2.0, Mihailo Backović, Antony Martini, Olivier Mattelaer**, Kyoungchul Kong, Gopolang Mohlabeng**, *Physics of Dark Universe* 9-10 37-50

Kinematic discrimination of tW and ttbar productions using initial state radiation Doojin Kim, **Kyoungchul Kong**, *Physics Letters* B751 (2015) 512-524

Tran, Nanayakkara, Yuan, Kacprzak, Glazebrook, Kewley, Momcheva, Papovich, Quadri, **Rudnick**, Saintonge, Spitler, Straatman, Tomczak, ZFIRE: Galaxy Cluster Kinematics, H-alpha Star Formation Rates, and Gas-Phase Metallicities of XMM-LSS J02182-05102 at z=1.6233, *Astrophysical Journal* (2015) 811, 28

PROPOSALS FUNDED

Prof. Greg Rudnick received a grant ($149,858) from the *Space Telescope Science Institute* to study the assembly of passive galaxies in distant galaxy clusters. This grant funds analysis of the archival HST data, the census of the galaxy population in the clusters, and the analysis of its growth using models developed at the University of Kansas. Also, the National Science Foundation awarded "Collaborative Research: The GOGREEN Survey - Caring about the Environment". Greg is the lead at Kansas and the other two institutions are at UC Irvine and UC Riverside. The approved amount for KU is $347,556 over three years. This is an observational program on the two largest telescopes that the US astronomical community has access to, twin 8-meter diameter aperture Gemini telescopes located on Mauna Kea in Hawaii and in the Chilean Atacama Desert.

ALUMNI NEWS

Connie Wells, MS physics 1999, was awarded *Woman Physicist of the Month* for August 2015 by the *American Physical Society*. She teaches at Pembroke Hill School in Kansas City, and is the first high school teacher to be selected for this award. http://www.aps.org/programs/women/scholarships/womanmonth/2015.cfm

Dimitra Atri, PhD physics 2011, was quoted extensively in a January online account by *Discovery News* regarding the effect of changing cosmic ray flux on life in the Universe.

Brian Thomas, PhD physics 2005, presented "Solar Irradiance Changes and Photobiological Effects At Earth's Surface Following Astrophysical Ionizing Radiation Events" at the *American Astronomical Society* meeting in Kissimmee, Florida January 7.

DEPARTMENT NEWSLETTER--CALL FOR ITEMS: Please send your items to Adrian Melott (melott@ku.edu). It's a lot easier to use them if you make them editor-ready: Group them according to the kind of item. Use plain text or Word. Don't number them. Don't say "I visited the Sheboygan Zoo." Use your name (third person). Etc.…

Department of Physics and Astronomy

University of Kansas

1251 Wescoe Dr. # 1082

Lawrence, KS 66045