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## DEPARTMENT OF PHYSICS AND ASTRONOMY

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Vol. XXXVI No 4 UNIVERSITY OF KANSAS November 16, 2016

IN MEMORY

Former KU physics professor **Gordon Wiseman** died November 19 in Lawrence. He was 99 years old. He married Mavis L. Paterson on April 5, 1942 in Brookings, South Dakota. She preceded him in death on April 1, 2012.

Gordon received his B.S. degree from South Dakota State in 1938 and then received his M.S, (1941) M.A, (1947) and Ph.D. (Physics, 1950) all from the University of Kansas. While finishing his Master's degree at KU, he was a Professor at Culver Stockton College in Canton, Missouri. At the outset of World War II, he and Mavis moved to Lawrence where Gordon taught physics to the large number of servicemen enrolled at the University during the war. Following the war, he finished his Ph.D. and joined the faculty. He was a Professor of Physics at the University of Kansas until retiring in 1987 as Professor Emeritus. He served as Associate Chairman from 1965 till his retirement. He had an active career, including consulting for the Navy and for the government of Venezuela, running summer programs at KU for high school physics teachers, and organizing the beginnings of what was to become a highly successful engineering physics program at KU.

He was a member of the First Presbyterian Church, Lawrence, Sigma Pi Sigma, and the Lawrence Chamber of Commerce. Following his retirement, he was very active in the Endacott Society at the University. He is survived by a number of persons, including his son Alan, a 1980's physics graduate of KU, now a member of the LIGO collaboration and a faculty member at the University of Wisconsin-Milwaukee.

OUT AND ABOUT

Prof. Phil Baringer has an essay on the physics of time in the catalog for the *Spencer Museum of Art's* "Temporal Turn" exhibition. The exhibition runs from Nov. 10, 2016 through March 12, 2017 and features Asian art inspired by science and science fiction.

Prof. Kong gave a plenary talk, entitled by "Unexplored landscape of N-body resonances" at the *Durham-Kavli-IPMU-KEK-KIAS Workshop*, KIAS, Korea (October

24-28, 2016). He also gave a theory seminar on "Non-standard resonance searches at the LHC", at *Pittsburgh Particle physics, Astrophysics, and Cosmology Center, University of Pittsburgh, PA* (September 13, 2016)

John Martens and **John Ralston** attended the *Midwest Theory Get Together* held at *Argonne National Laboratory* September 30-October 1. Martens gave a talk "Quantum Tomography Applied to Lepton Pair Production". Ralston gave a talk "How Fundamental are YOUR Constants?".

The research of **Profs. Medvedev and Melott** was featured in the article "The Next Extinction from Space" in the September issue of *Discover* magazine.

Prof. Melott presented the third annual *Larry G. Grimes Lecture* at the homecoming weekend of *Bethany College (WV)* on Oct 8 entitled: "Blast in the Past: Effects on the Earth from a Nearby Supernova". He was also the guest speaker for the *Astronomy Associates of Lawrence, September 25*: "Death Stars".

Theory student **Gopolang Mohlabeng** gave a series of seminars on "Multi-Component Dark Matter through a radiative Higgs Portal", at the *University of Notre Dame, Brookhaven National Laboratory, and Stony Brook University* in September and October, 2016

Workshops attended by **Prof. Christophe Royon**:

- April 27: Participation at the *French-American science festival, Chicago*, organized by the French Consulate:

<http://sciencefest.france-science.org>

- May 3: seminar at the *University of Santa Cruz, US*

- 3rd Elba workshop on forward physics at the LHC, Elba Island, Italy, May 30-June 1 2016: member of the organizing committee (convener of the high luminosity physics session) and invited presentation about Diphoton Phenomenology

<https://indico.cern.ch/event/505807/timetable/>

- Low x 2016, June 6-10 2016, Gyongyos, Hungary: [http://www-](http://www-d0.fnal.gov/~royon/lowx_hungary/)

[d0.fnal.gov/~royon/lowx_hungary/](http://www-d0.fnal.gov/~royon/lowx_hungary/) Chairman of the Organizing Committee

Presentation about Photon Quartic Anomalous Couplings Studies at the LHC

- The *Electron Ion Collider User Group Meeting*, July 7-9 2016, *Argonne National Lab, USA* Invited Presentation about: Experience from HERA and LHC on diffraction towards the EIC

<https://indico.hep.anl.gov/indico/conferenceOtherViews.py?view=standard&confId=1002>

- Seminar at the *Institute of Physics, Prague, Czech Republic* about forward Physics at the LHC, July 14 2016

- Invited presentation about *Forward Physics at the LHC* and the 750 GeV di-photon possible resonance for the workshop on Particle Production in Hadronic Collisions for the 80th Birthday of Andrzej Bialas, President of the Academy of Science and Literature, Cracow, July 25 2016

<http://th.if.uj.edu.pl/indico/event/1/>

- Presentation about Photon exchange processes at the LHC at *the ICHEP 2016 Conference*, Chicago, August 3-11 2016, Chicago, USA

<https://www.ichep2016.org/>

- Convener of the diffractive session at the *46th International Symposium on Multiparticle Dynamics* (ISMD 2016) conference, Jeju Island, Korea, August 29, September 2 2016

<https://nuclear.korea.ac.kr/indico/conferenceDisplay.py?confId=166>

and presentation about quartic photon anomalous couplings studies at the LHC

- Invited review talk about Forward Physics at the LHC at the *50th anniversary of the Brazilian Physics Association*, Natal, Brazil, September 4-7 2016,

<http://sbfisica.org.br/~fisica2016/en/>

- Chairman of the organizing committee for the workshop on forward and heavy ion physics at the LHC, Trento, Italy, September 26-30 2016

<http://www.ectstar.eu/node/1661>

In October, Gregory Rudnick organized a week-long workshop at the International Space Sciences Institute in Bern, Switzerland. The workshop title was "The Effect of Dense Environments on Gas in Galaxies over 10 Billion Years of Cosmic Time"

In June, **Gregory Rudnick** gave an invited talk at a workshop on Frauenchiemsee in Bavaria, Germany. The title of the workshop was "Unravelling galaxies: Where do the stars form?". The title of his presentation was "The ESO Distant Cluster Survey & The Local Cluster Survey"

Gregory gave invited colloquia in May at *the Hamburg Observatory, the Munich University Observatory, and the Vienna Observatory*. In September he gave an invited astrophysics seminar at Purdue University, in October he gave a colloquium at the *Geography and Atmospheric Sciences* department at KU, and in November he gave an *colloquium at Benedictine University* and at the *KU Physics and Astronomy department*.

Gregory gave a public talk in November at *KU* titled "The evolution of galaxies over the last 10 billion years"

HONORS AND AWARDS

Prof. Christophe Royon was appointed as an honorary Professor at the *University of Gyongyos, Hungary* (and got an official diploma as well as a medal).

Prof. Hume Feldman was named a *Fellow of the American Physical Society* "For his important contributions to cosmology, particularly in the study cosmological

perturbations, the statistical and dynamical properties of the large-scale-structure of the Universe, the innovative treatment of cosmic peculiar velocity fields and the imposition of constraints on cosmological parameters.” Only ½ of 1% of the membership can be named Fellows in a given year.

Undergraduate physics major **Eilish Gibson** has been named one of KU’s four nominees for the *Goldwater Scholarship*. Eilish does research with our CMS particle physics group.

Prof. Alice Bean was named a Fellow of the *American Association for the Advancement of Science* “For her contributions to particle physics, undergraduate research, and her creation of novel outreach including for policies around climate change and the "Quarked!" project.”

NEW FUNDING

Gregory Rudnick received funding for a NASA Astrophysics Data and Analysis Program (ADAP) proposal in the amount of \$159,520. The title of the proposal was "Confronting models of star formation quenching in galaxy clusters with archival Spitzer data"

RECENT PUBLICATIONS

Kafle, T. R., Wang, T., Kattel, B., Liu, Q., Gong, Y., Wu, J., and Chan, W. –L., Hot Exciton Relaxation and Exciton Trapping in Single-Walled Carbon Nanotube Thin Films, *J. Phys. Chem. C* 120, 24482-24490 (2016).

Y. P. Zhong, D. Xu, P. Wang, C. Song, Q. J. Guo, W. X. Liu, K. Xu, B. X. Xia, C.-Y. Lu, **Siyuan Han**, Jian-Wei Pan, and H. Wang, Emulating anyonic fractional statistical behavior in a superconducting quantum circuit, *Phys. Rev. Lett.* 117, 110501 (2016), Editors’ Suggestion.

H. K. Xu, C. Song, W. Y. Liu, G. M. Xue, F. F. Su, H. Deng, Ye Tian, D. N. Zheng, **Siyuan Han**, Y. P. Zhong, H. Wang, Yu-xi Liu, and S. P. Zhao, Coherent population transfer between uncoupled or weakly coupled states in ladder-type superconducting Qutrits, *Nat. Comm.* 7, 11018 (2016).

Ming Gong, Xueda Wen, Guozhu Sun, Dan-Wei Zhang, Dong Lan, Yu Zhou, Yunyi Fan, Yuhao Liu, Xinsheng Tan, Haifeng Yu, Yang Yu, Shi-Liang Zhu, **Siyuan Han**, and Peiheng Wu, Simulating the Kibble-Zurek mechanism of the Ising model with a superconducting qubit system, *Sci. Rep.* 6, 22667 (2016).

Ming Gong, Yu Zhou, Dong Lan, Yunyi Fan, Jiazheng Pan, Haifeng Yu, Jian Chen, Guozhu Sun, Yang Yu, **Siyuan Han**, and Peiheng Wu, Landau-Zener-Stuckelberg-Majorana interference in a 3D transmon driven by a chirping microwave, *Appl. Phys. Lett.* 108, 112602 (2016).

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).

Probing TeV scale Top-Philic Resonances with Boosted Top-Tagging at the High Luminosity LHC, **Jeong Han Kim, Kyoungchul Kong**, Seung J. Lee, **Gopolang Mohlabeng**, *Phys.Rev. D*94 (2016) no.3, 035023

"Light sterile neutrinos, lepton number violating interactions, and the LSND anomaly", K. S. Babu, **Doug McKay**, Irina Mocioiu, and Sandip Pakvasa, *Phys. Rev. D* 93, 113019 (2016)

"The Dirac form factor predicts the Pauli form factor in the Endpoint Model " by Sumeet Das, Pankan Jain (both of IIT Kanpur, India) and **John P. Ralston**. *The European Physical Journal C*, 76(7), 1-10 (2016) DOI 10.1140/epjc/s10052-016-4224-4

"Galaxies Probing Galaxies at High Resolution: Co-rotating Gas Associated with a Milky Way Analog at $z=0.4$ ", Diamond-Stanic, Aleksandar M.; Coil, Alison L.; Moustakas, John; Tremonti, Christy A.; Sell, Paul H.; Mendez, Alexander J.; Hickox, Ryan C.; **Rudnick, Gregory**, 2016, *ApJ*, 824, 24

"Disc colours in field and cluster spiral galaxies at $0.5 < z < 0.8$ ", Cantale, Nicolas; Jablonka, Pascale; Courbin, Frédéric; **Rudnick, Gregory**; Zaritsky, Dennis; Meylan, Georges; Desai, Vandana; De Lucia, Gabriella; Aragón-Salamanca, Alfonso; Poggianti, Bianca M.; and 2 coauthors, 2016, *A&A*, 589, A82

ALUMNI NEWS

Dimitra Atri (Ph.D. 2011) had his work "Interstellar Clouds Eroded Martian Atmosphere" profiled online in *Discovery* <http://www.seeker.com/interstellar-sources-eroded-martian-atmosphere-2003115479.html> . Then, *Science* profiled his research on possible underground life powered by muons: <http://www.sciencemag.org/news/2016/10/alien-life-could-feed-cosmic-rays>

John Beacom (B.S. 1991) was profiled on KU's *Undergraduate Research* website "Alumni Spotlight" for September 2016. See <https://ugresearch.ku.edu/spotlight/john-beacom>

Brian Thomas (Ph.D. 2005) recently published "Atmospheric constituents and surface-level UVB: Implications for a paleoaltimetry proxy and attempts to reconstruct UV exposure during volcanic episodes" (2016) in *Earth and Planetary Science Letters* 453, 131 along with Byron D. Goracke and Sean M. Dalton, who were students at Washburn University.

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....

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