Title: Quantum Monte Carlo Studies of Normal State Properties of the Hubbard Model

Speaker: Edwin Huang (University of Illinois Urbana Champaign)

Date: Monday, September 23, 2019

Time/Location: 12:00 pm / 190 ESB

Abstract: Many of the outstanding challenges in understanding strongly correlated quantum matter stem from their unusual behavior in the normal state. We investigate this topic from the perspective of numerical simulations of paradigmatic model Hamiltonians. In the first part of my talk, I will present large scale determinantal quantum Monte Carlo (DQMC) and density matrix renormalization group (DMRG) calculations demonstrating fluctuating spin stripes in both the Hubbard and Emery models on a 2d square lattice. Our results provide new perspectives for the phenomenology of high-Tc cuprate superconductors. In the second part, I will discuss transport properties of the 2d Hubbard model evaluated by analytic continuation of DQMC data. Our data, extending to temperatures around an order of magnitude below the Fermi temperature, show features reminiscent of the strange metal phase observed in unconventional superconductors, including linear-T dependence and violation of the Mott-Ioffe-Regel limit.

Many of the outstanding challenges in understanding strongly correlated quantum matter stem from their unusual behavior in the normal state. We investigate this topic from the perspective of numerical simulations of paradigmatic model Hamiltonians. In the first part of my talk, I will present large scale determinantal quantum Monte Carlo (DQMC) and density matrix renormalization group (DMRG) calculations demonstrating fluctuating spin stripes in both the Hubbard and Emery models on a 2d square lattice. Our results provide new perspectives for the phenomenology of high-Tc cuprate superconductors. In the second part, I will discuss transport properties of the 2d Hubbard model evaluated by analytic continuation of DQMC data. Our data, extending to temperatures around an order of magnitude below the Fermi temperature, show features reminiscent of the strange metal phase observed in unconventional superconductors, including linear-T dependence and violation of the Mott-Ioffe-Regel limit.
Title: Panning for Gold with Things that Go Bang in the Night

Speaker: Dr. Jennifer Barnes (Columbia University)

Date: Tuesday, September 24, 2019

Time/Location: 3:45 pm / Astronomy 134

Abstract: The first successful simultaneous observation of gravitational-wave and electromagnetic radiation from the neutron star merger GW170817 marked the advent of the era of multi-messenger astronomy. Parallel advances in gravitational-wave detectors and electromagnetic observing facilities will enable the astrophysics community to study in unprecedented detail compact object mergers and the host of exotic phenomena that accompany them. Of particular interest are the astrophysical origins of heavy elements produced through rapid neutron capture (r-process) nucleosynthesis. I will show how theoretical modeling of mergers’ electromagnetic “kilonova” counterparts provided the most conclusive evidence to date that merging neutron stars trigger r-process nucleosynthesis. I will also discuss how on-going and future work can clarify the role of these mergers in seeding the Universe with heavy elements, as well as constrain the importance of alternate potential sites of r-production. Finally, I will situate kilonovae in the context of radioactively-powered transients in general, and explain how the tools developed to study them can be applied to a continuum of explosive systems to elucidate the full range of astrophysical nucleosynthesis.
Monday, September 23: Institute for Condensed Matter Theory Seminar: "Quantum Monte Carlo studies of normal state properties of the Hubbard model"

Tuesday, September 24: Astronomy Colloquium "Panning for Gold with Things that Go Bang in the Night"

Wednesday, September 25: Physics Careers Seminar: "US DOE National Labs: Working at SNL as a Physicist"

Wednesday, September 25: Astrophysics, Gravitation and Cosmology Seminar - "Dark energy and the Hubble Tension"

Wednesday, September 25: IQUIST Seminar - Felix Leditzky

Wednesday, September 25: Physics Colloquium: “Neutrinos: From Zeros to Heroes?”

Visitors:

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**Physics Careers Seminar**

**Title:** US DOE National Labs: Working at SNL as a Physicist

**Speaker:** Dr. Clark Snow, Sandia National Lab

**Date:** Wednesday, September 25, 2019

**Time/Location:** 11:00 am/ 204 Loomis

**Abstract:** The US Department of Energy (DOE) Laboratories are a national treasure where amazing science is performed and difficult problems are tackled. There are 17 DOE Laboratories spread across the country. In my talk I’ll give an overview of Sandia National Labs, one of the 17 Labs and my perspectives of working at SNL for 16 years. I’ll describe what it takes to be successful and hopefully convince you that Sandia is the best of the 17 but that you’d still have a great career at the other 16.
Astrophysics, Gravitation and Cosmology Seminar

Title: Dark energy and the Hubble Tension

Speaker: Jeremy Sakstein (University of Pennsylvania)

Date: Wednesday, September 25, 2019

Time/Location: 12:00 pm/464 Loomis

Abstract: Modified gravity theories that can drive the cosmic acceleration predict fifth forces that are hidden in the Milky Way using screening mechanisms. It is possible that other galaxies could be unscreened depending on their environment. In this talk, I will show how unscreening Cepheid stars in other galaxies could alter the calibration of the distance ladder, alleviating the tension between local and CMB measurements of the Hubble constant.
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<td>IQUIST Seminar</td>
<td>Felix Leditzky (JILA, University of Colorado-Boulder)</td>
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http://physics.illinois.edu/bluesheet.asp
Title: Neutrinos: From Zeros to Heroes?

Speaker: Roxanne Guenette (Harvard University)

Date: Wednesday, September 25, 2019

Time/Location: 4:00 pm / 141 Loomis

Abstract: The Standard Model, that describes extremely well the particles and their interactions, predicts that neutrinos are massless and only interacts via weak interaction. These properties made neutrinos the least interesting particles of the model... until the discovery that they oscillate! This paradigm shifting result implies that neutrinos are massive particles and opens the door to physics beyond the Standard Model - the holy grail of particle physics. It is now clear that neutrinos could hold the key to many great mysteries of physics, such as the imbalance in the Universe between matter and anti-matter, and several current and next generation of experiments are gearing up to provide new answers. Neutrinos are also the only particles of the Standard Model that could be of Majorana nature, a characteristic that would give considerable strength to theories that propose to explain the mass of these elusive particles and that intend to explain the matter-antimatter asymmetry. After reviewing the intriguing properties of neutrinos and presenting the open questions of our field, I will explain how searching for neutrino less double beta decays with Xenon High Pressure Time Projection Chambers (like the NEXT experiment is doing) could give us a unique opportunity to discover a Majorana neutrino. I will also discuss how such discovery would be a revolution for Particle Physics.
Available Postdoc Position at University of Waterloo

There is a postdoc position available in Anton Burkov’s group to start in the Fall of 2020 or earlier.

The position is for two years, with a possible extension. The research area is topological phases of matter. The position will be based at University of Waterloo, but collaboration with nearby Perimeter Institute researchers is possible and will be encouraged.

Interested candidates should submit a CV and arrange for 2-3 recommendation letters to be emailed directly to aburkov@uwaterloo.ca
Available Junior Research Chair Positions

The Department of Physics at ENS Paris invites applications for two JRC (Junior Research Chairs) at postdoctoral level. Appointments will be for two years with a probable one-year extension.

The Department aims at recruiting outstanding candidates with international experience. Research activities can be experimental and/or theoretical; this year, the department aims at hiring a Junior Research Chair in Theoretical Biophysics (research topic: biological physics: from decision theory to navigation). The other position is open either for theoreticians or experimentalists. Experimental projects are encouraged through a reserved budget.

Research themes should correspond to one of the following ones:
- Quantum physics: from atoms to condensed matter
- Biophysics: from the cell to the organism
- Non-linear physics: from the laboratory to the cosmos
- Statistical and theoretical physics

Some participation in teaching within ENS-ICFP (International Centre for Fundamental Physics and its Interfaces) Master program is part of the duties


In addition to an internationally competitive salary, ENS-ICFP provides an attractive travel allowance and research funds for experimentalists (150 000 euros). The successful candidates are fully integrated into the Department of Physics and its constituent research laboratories. For more detailed information regarding the research undertaken at the Department of Physics, please consult our website http://www.phys.ens.fr/spip.php?rubrique258&lang=en

Applications must be exclusively submitted through AcademicJobsOnline:

https://academicjobsonline.org/ajo/jobs/14026.

Short-listed candidates will be interviewed (videoconferences) in early December 2019.

Only applications received by October 30, 2019 will be considered. The hiring committee will make offers in late 2019. Positions will normally start in September 2020, but this is negotiable.
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Available Postdoctoral Positions at QMI, University of British Columbia

The UBC Stewart Blusson Quantum Matter Institute http://qmi.ubc.ca invites applications for highly motivated postdoctoral fellows interested in a variety of research topics related to quantum materials from the perspectives of growth, experimentation, applications, computational modeling, and theory. SBQMI has also initiated a specific set of thrusts in disorder-based functional materials, quantum information, and van der Waals & 2D materials as part of our Grand Challenges projects. For more information on the Grand Challenges, please see https://qmi.ubc.ca/grand-challenges

The SBQMI Postdoctoral Fellowships offer competitive salary support and benefits (including extended health and dental coverage).

Interested candidates should contact principal investigators https://qmi.ubc.ca/discover/principal-investigators aligned with their interests to discuss potential projects. Candidates must have obtained, or expect to complete, their doctoral degree no later than September 2020, and be able to demonstrate a solid scientific background—as evidenced by publication record, letters of recommendation, and research proposal. Evidence of teamwork, strong communication skills, and ability to supervise students will also be considered.

To apply, please provide:
• Brief cover letter, including the SBQMI researcher(s) with whom you have discussed projects, and the names of those who will provide recommendations;
• Curriculum Vitae, including full publication list;
• 1 - 2 page research proposal;
• 3 letters of recommendation (to be sent directly by your referees).
Candidates: submit your application online at www.facultycareers.ubc.ca/35146

Referees: please email letters of recommendation to jobs@qmi.ubc.ca.

Application deadline: All materials (including reference letters) must be received by October 15, 2019 to ensure full consideration. In-person interviews with applicants who best meet our criteria will be held at the UBC Vancouver campus in early December 2019.
Assistant Professor in Theoretical Physics Position at the University of Washington

Outstanding candidates in all areas of theoretical physics are invited to apply for one or more full-time 9-month appointments at the tenure-track Assistant Professor level in the Department of Physics at the University of Washington. The anticipated start date is September 2020.

The Physics Department has a wide-ranging research program and seeks candidates who will enhance existing research directions and/or begin new directions. It aims to build a welcoming and supportive climate for all students and faculty. University of Washington faculty members engage in teaching, research and service. The successful applicant or applicants will be expected to participate in undergraduate and graduate teaching, to develop an innovative, vigorous, externally-funded research program, and to actively contribute to the running of the department.

Applicants must have a Ph.D. in or foreign equivalent degree in Physics, or a related field, by the date of appointment.

Applications should be submitted to https://apply.interfolio.com/65589 and include a cover letter, curriculum vitae, a statement of future research interests, a statement outlining teaching experience, interest and philosophy, and a statement describing their past and proposed efforts to promote diversity, equity, and inclusion in the field, together with three letters of reference.

Review of applications will begin on October 28, 2019. Please direct all inquiries to facsrch@uw.edu.
Assistant, Associate or Full Professor in Theoretical Physics Position at the University of Washington

Outstanding candidates in all areas of theoretical physics are invited to apply for one or more full time 9-month appointments open at any rank (Assistant, Associate or Full Professor) in the Department of Physics at the University of Washington. The anticipated start date is September 2020.

The Physics Department has a wide-ranging research program and seeks candidates who will enhance existing research directions and/or begin new directions. It aims to build a welcoming and supportive climate for all students and faculty. University of Washington faculty members engage in teaching, research and service. The successful applicant or applicants will be expected to participate in undergraduate and graduate teaching, to develop an innovative, vigorous, externally-funded research program, and to actively contribute to the running of the department.

Applicants must have a Ph.D. in or foreign equivalent degree in Physics, or a related field, by the date of appointment.

Applications should be submitted at: https://apply.interfolio.com/65634 and include a cover letter, curriculum vitae, a statement of future research interests, a statement outlining teaching experience, interest and philosophy, and a statement describing their past and proposed efforts to promote diversity, equity, and inclusion in the field. Please provide contact information including name, email, and phone number for 3 references who may be contacted at a later stage of the search.

Review of applications will begin on October 28, 2019. Please direct all inquiries to facsrch@uw.edu.
CALENDAR OF EVENTS http://physics.illinois.edu/bluesheet.asp

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Visitors:

Postdoctoral Position in Condensed Matter Theory at Rice University

The Condensed Matter Theory Group at Rice University expects the opening of a postdoctoral position with a start date in Fall 2020. The successful candidate will work in Prof. Qimiao Si’s research group, in a setting interactive with other faculty, postdocs and students in our CMT group, as well as an active group of experimentalists. The position is targeted towards strongly correlated electron systems, broadly construed. Examples of the specific areas of interest include quantum phase transitions, unconventional superconductivity, topological matter in strongly correlated settings, and frustrated quantum magnetism. Both analytically and numerically minded candidates will be considered. Applicants should send a single PDF file that contains a CV, a brief (typically up to 3 pages) statement of research interests and 2 (p)reprints, and arrange for three letters of recommendation to be sent, through the AcademicJobsOnline system:

https://academicjobsonline.org/ajo/jobs/14639 .

Application review will begin on November 1, 2019 and will continue until the position is filled. Rice University is an EO/AA employer.
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Visitors:

Postdoctoral Openings in Condensed Matter Theory at UCSB

There are several open postdoctoral positions in condensed matter theory at the University of California, Santa Barbara. For best consideration, we recommend applying before November 1. All positions can be applied for on Academic Jobs Online. Here are the links:

https://academicjobsonline.org/ajo/jobs/14267
https://academicjobsonline.org/ajo/jobs/14681
https://academicjobsonline.org/ajo/jobs/14183

About the Gordon and Betty Moore Foundation and EPIQS Initiative

The Moore Foundation believes in bold ideas that create enduring impact in the areas of science, environmental conservation and patient care. Visit Moore.org or follow @MooreFound. The foundation’s $185-million EPIQS initiative promotes discovery-driven research in the field of quantum materials. Through a variety of funding approaches, EPIQS aims to enable a community of leading experimentalists, materials synthesis experts and theorists to maximize their potential to explore, discover and understand emergent behavior of complex quantum matter.

The Moore Postdoctoral Scholars in Theory of Quantum Materials program is an integral part of EPIQS and supports theoretical physicists of outstanding promise at an early stage of their careers. The Moore Postdoctoral Scholars are provided with a significant independence in selection of their research directions within their departments and can acquire a breadth of expertise by working with multiple faculty members.

The Moore Foundation values diversity and encourage applications from individuals regardless of their age, sex, sexual orientation, gender identity, race, national origin, religion or disability.
Applications Are Now Being Accepted for Postdoctoral Fellowships at Perimeter Institute for Theoretical Physics

Perimeter Institute for Theoretical Physics is inviting applications for Postdoctoral Research positions. For more information please visit our website.

Perimeter Institute offers a dynamic, multi-disciplinary environment with maximum research freedom and opportunity to collaborate. We welcome all candidates to apply by November 1, 2019 but applications will be considered until all positions are filled.

Perimeter Institute is now accepting applications for the 2020/2021 academic year. The following information will be required to complete the application:

- Curriculum Vitae
- Publications List
- Research Statement
- Contact information for 3 referees
Application for Postdoctoral Research Associate - Gordon and Betty Moore Foundation

Applications are now being accepted for postdoctoral research associates or more senior researchers as part of the Gordon and Betty Moore Foundation's Emergent Phenomena in quantum Systems initiative (EPiQS).

If there are candidates that you wish to recommend to us, we would very much like to hear from you. Interested candidates must apply online at https://www.princeton.edu/acad-positions/position/13401

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Princeton Center for Theoretical Science Postdoctoral Fellowships

Center Postdoctoral Fellowships are among the most prestigious postdoctoral positions offered in the theoretical sciences at Princeton. They are intended for early-career theoretical scientists, broadly construed, including the fields of astrophysics, biology, chemistry, geosciences, physics, and engineering. The nominees should be individuals with outstanding talent and accomplishment who are eager to broaden their scientific horizons. We particularly encourage nominations of qualified candidates who are women or members of other groups that are underrepresented in the theoretical sciences. Fellows receive a three-year appointment in the Center fully supported by Center funds, an office in the Center facility, and have full freedom to develop their scientific interests with the support and mentoring of the senior Faculty Fellows. It is our intention that the Center experience will have a profound impact on the scientific development and future careers of the Fellows.

The deadline for receipt of the Postdoctoral nomination, reference letters, and supporting materials from the candidate is **October 15, 2019** so it is important for you to submit your nomination as soon as possible to give your candidate and their references time to complete their parts.

The nomination process is very simple: click on this link: [https://puwebp.princeton.edu/AcadHire/nominations/index.xhtml?listingId=12881](https://puwebp.princeton.edu/AcadHire/nominations/index.xhtml?listingId=12881) and submit the candidate’s name, email address, and a nomination letter, in PDF format. The candidates will then be sent information necessary to complete their application and to submit letters of reference should they choose to accept the nomination. (Please note, this is a new nomination site, so please use this link to make sure you get to the correct page.) A doctorate degree in a related field is required.

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**Visitors:**

- Princeton Center for Theoretical Science Postdoctoral Fellowships
  - Fellowships are among the most prestigious postdoctoral positions offered in the theoretical sciences at Princeton. They are intended for early-career theoretical scientists, broadly construed, including the fields of astrophysics, biology, chemistry, geosciences, physics, and engineering. The nominees should be individuals with outstanding talent and accomplishment who are eager to broaden their scientific horizons. We particularly encourage nominations of qualified candidates who are women or members of other groups that are underrepresented in the theoretical sciences. Fellows receive a three-year appointment in the Center fully supported by Center funds, an office in the Center facility, and have full freedom to develop their scientific interests with the support and mentoring of the senior Faculty Fellows. It is our intention that the Center experience will have a profound impact on the scientific development and future careers of the Fellows.

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**2020 Maglab Theory Winter School**

**Title:** Quantum Matter Without Quasiparticles

**Dates:** Monday, Jan 6, to Friday, Jan 10, 2020

**Location:** National High Magnetic Field Laboratory, Tallahassee, FL

The school is aimed at research-active graduate students and postdocs. The tentative topics of the school include electron transport without quasiparticles, Sachdev-Ye-Kitaev models, novel phases in twisted bilayer graphene, fracton topological phases, deconfined quantum criticality, and many-body localization.

The application to attend 2020 Theory Winter School is open now. The application deadline is **Oct 18, 2019**. The full list of confirmed lecturers, the details about the school, and the link to the application form are available at the our website, [https://nationalmaglab.org/news-events/events/for-scientists/winter-theory-school](https://nationalmaglab.org/news-events/events/for-scientists/winter-theory-school)

Please contact us with any questions by email at **aiaved@magnet.fsu.edu** (Arshad Javed) or **qureshi@magnet.fsu.edu** (Aisha Qureshi).
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LMS-IMA Joint Meeting: Mathematics of Planet Earth - Reading

November 21st 2019

The University of Reading will host the Joint Meeting of the London Mathematical Society and of the Institute of Mathematics and Applications. The theme of the LMS-IMA Joint Meeting is Mathematics of Planet Earth. The lectures are aimed at a general mathematical audience. The conference has no fees but registration is mandatory. Deadline: November 8th. The conference will take place at the Park House, Whiteknights Campus, University of Reading, Reading, UK.

Keynote Speakers: P. Ashwin (Exeter), C. Cotter (Imperial College), M. Ghil (UCLA/ENS), P. Imkeller (Von Humboldt), K. Padberg-Gehle (Luneburg), S. Vaienti (CPT-Luminy), B. Wingate (Exeter)

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Visitors:

4th Bangkok Workshop on Discrete Geometry, Dynamics and Statistics

January 6-10, 2020

The workshop will revolve around mathematical physics of discrete systems and cover a wide range of topics (random geometries, discrete statistical models, random matrices and tensors, random graphs, etc), united by similarities in the relevant mathematical structures, with potential applications ranging from quantum gravity to condensed matter physics to data analysis and applied modelling. More information available at

http://www.thaihep.phys.sc.chula.ac.th/BKK2020DSCR/
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Visitors:

Postdoctoral Research Position on Physics of Bio/Bio-inspired Systems at Univ. of North Carolina - Chapel Hill

The postdoctoral scholar will develop theory and numerical models of biological processes or bio-inspired mechanisms that functions out of equilibrium. The goal is to look for the thermodynamic design principles of dissipative functional materials and functional biophysical processes. Examples includes: how do biological systems processes information? How does energy expenditure improve noise robustness and selectivity? See https://sites.google.com/site/zhiyuelu/positions