



ASPEN CENTER FOR PHYSICS

2012 WINTER CONFERENCE

ON

BIOLOGICAL PHYSICS

January 2 – 7, 2012

Monday Evening Reception

Meetings Tuesday morning through Saturday noon

GROWTH AND FORM: PATTERN FORMATION IN BIOLOGY

How do biological systems regulate growth and produce the patterns seen in nature? This conference will explore this broad question that spans such diverse topics as developmental biology, cancer, biomineralization, and flocking. Specific examples include embryonic development, the formation and structure of organs and tissues, wound healing, branching structure of neurons and blood vessels, leaf arrangement and flower patterns, microstructure of bones and seashells, swarming of bacteria and biofilm formation, and flocking of birds and fish. An increasing number of physicists, mathematicians, engineers, and biologists are using physical principles, statistical mechanics, and modeling to approach this wide spectrum of problems. Indeed, 2010 was the 150th anniversary of the birth of D'Arcy Wentworth Thompson, the author of the classic work *On Growth and Form*. Unlike the biologists of his day who emphasized the role of evolution in determining the form and structure of living organisms, Thompson pointed out the importance of physical laws and mechanics. This is true now more than ever.

Application deadline is October 15, 2011

Please complete your application at: www.aspenphys.org

Conference Website: www.aspenphys.org/documents/program/winterworkshops12.html

ORGANIZERS:

Susan Coppersmith, University of Wisconsin, Madison
M. Cristina Marchetti, Syracuse University
Clare Yu, University of California, Irvine

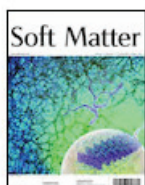
The Aspen Center for Physics is committed to a significant participation of women and under-represented groups in all of its programs.

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ASPEN CENTER FOR PHYSICS

2012 WINTER CONFERENCE ON CONDENSED MATTER PHYSICS

January 8 – 14, 2012
Sunday Evening Reception
Meetings Monday morning through Saturday noon

NEW DIRECTIONS IN ULTRACOLD ATOMIC SYSTEMS

This conference will cover the latest developments in ultra-cold atoms and molecules. The precision and control of atomic physics now allows the study of well-characterized and tunable many-body systems, ranging from dynamics of strongly correlated bosons and fermions to quantum magnetism. This has created a new direction in condensed matter physics, the experimental study of idealized model systems, which is strongly connected to theoretical work.

Application deadline is October 15, 2011

Please complete your application at: www.aspenphys.org

ORGANIZERS:

Ehud Altman, Weizmann Institute
Eugene Demler, Harvard University
Markus Greiner, Harvard University
Wolfgang Ketterle, Massachusetts Institute of Technology
Karyn Le Hur, Yale University
Carlos Sá de Melo, Georgia Institute of Technology

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ASPEN CENTER FOR PHYSICS

2012 WINTER CONFERENCE

ON

ASTROPHYSICS

January 15 – 20, 2012

Sunday Evening Reception

Meetings Monday 8:00 AM through Friday 10:30 AM

EXOCLIMES 2012:

THE DIVERSITY OF PLANETARY ATMOSPHERES

Ground-based surveys and NASA's Kepler mission are discovering countless planets, for which only mass, radius and orbit are known. Scientists and the public want to know what these worlds are like, which is largely a question of climate. Yet modelers are unable to rely on the myriad data that pin the climate models of Earth and -- to a lesser degree -- those of other Solar System worlds. Instead, we need models of planetary atmospheres that are robust to incident flux, rotation rate, chemistry, ionization, and surface gravity, to name a few. In the last half-decade, data from the ground and space have begun to place useful constraints on general circulation and 1-D climate models of hot, gaseous exoplanets; in the upcoming decade, new instruments and facilities will enable the characterization of potentially habitable terrestrial planets. Modelers need empirical data to guide their models, and astronomers need qualitatively new models to interpret their data. This meeting will provide a timely opportunity for astrophysicists, planetary scientists and climate modelers to exchange ideas about the state of the art. The two principal themes will be: 1) what exoplanet properties can we measure in the foreseeable future? and 2) how will these data constrain climate models?

Application deadline is October 15, 2011

Please complete your application at: www.aspenphys.org

Conference Website: www.exoclimes.org

ORGANIZERS:

Suzanne Aigrain (Oxford)

Nicolas Cowan (Northwestern University)

James Kasting (Pennsylvania State University)

Heather Knutson (Caltech)

Vikki Meadows (University of Washington)

Kristen Menou (Columbia University)

Raymond T. Pierrehumbert (University of Chicago)

Frederic Pont (Exeter)

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ASPEN CENTER FOR PHYSICS

2012 WINTER CONFERENCE

ON

ASTROPHYSICS

January 21 – 27, 2012

Saturday Evening Reception

Meetings Sunday morning through Friday noon

THE PHYSICS OF ASTRONOMICAL TRANSIENTS

Rapid advances in detector technology, computer processing power and data storage are fostering a data-driven revolution in astrophysics. This is enabling surveys that probe ever-larger areas of the sky and ever-fainter sources, opening up a vast discovery space. These advances also add temporal information to what was previously a relatively static picture of the sky. In addition to aiding the discovery of whole new classes of variable astronomical phenomena, temporal information probes the fundamental physics of the underlying objects. Coupling these surveys with innovative exploration strategies and novel theoretical work will open new windows onto the universe. This meeting will focus on issues related to the physics and discovery of astronomical transients. Topics will range from the extragalactic — detection of gamma-ray bursts and supernovae in distant galaxies, variable AGN — to the Galactic — variable stars, novae, and other cataclysmic events.

Application deadline is October 30, 2011

Please complete your application at: www.aspenphys.org

Conference Website: <http://cargo.ucsc.edu/tasc/aspen>

ORGANIZERS:

Enrico Ramirez-Ruiz (Lick Observatory)

Fred Rasio (Northwestern University)

Natalia Ivanova (University of Alberta)

Shri Kulkarni (California Institute of Technology)

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ASPEN CENTER FOR PHYSICS

2012 WINTER CONFERENCE

ON

ASTROPHYSICS

January 30 – February 4, 2012

Monday Evening Reception

Meetings Tuesday morning through Saturday noon

INFLATIONARY THEORY AND ITS CONFRONTATION WITH DATA IN THE PLANCK ERA

With upcoming new data from the Planck satellite and other CMB experiments, but also from the next generation Large Scale Structure surveys, our capabilities to explore the beginning of the universe and the theory of Inflation will undergo a major improvement in the coming years. In this light, it is timely to gather together observers and theorists to discuss, explore and develop the theoretical signatures of the Physics of the early universe as well as the associated new observational or data analysis techniques required to make the best of upcoming data.

Application deadline is October 30, 2011

Please complete your application at: www.aspenphys.org

ORGANIZERS:

Olivier Doré, JPL/Caltech
Fabian Schmidt, California Institute of Technology
Leonardo Senatore, Stanford University
Kendrick Smith, Princeton University

SCIENTIFIC ADVISORS:

Marc Kamionkowski, Department of Physics, Caltech
Eiichiro Komatsu, Department of Astronomy, University of Texas at Austin
Uros Seljak, Department of Physics, University of California Berkeley and University of Zurich
Eva Silverstein, Department of Physics, Stanford University and SLAC
Matias Zaldarriaga, School of Natural Sciences, Institute for Advanced Study

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ASPEN CENTER FOR PHYSICS

2012 WINTER CONFERENCE

ON

CONDENSED MATTER PHYSICS

February 5 – 10, 2012

Sunday Evening Reception

Meetings Monday morning through Friday noon

NEW PARADIGMS FOR LOW-DIMENSIONAL ELECTRONIC MATERIALS

Several of the most exciting recent developments in condensed matter involve new ways to create, probe and model low-dimensional electronic materials. The metallic interface between certain insulating oxides and the metallic surface of a three-dimensional (3D) topological insulator are both examples of novel 2D electron systems that inherit properties from the 3D host materials. The "conventional" two-dimensional electron gas has continued to produce surprises such as paired quantum Hall states, while graphene is an intrinsically two-dimensional system with several novel features. Finally, various types of control, from electric fields at interfaces to stimulation with tailored light fields, are making it possible to generate out-of-equilibrium states of great interest.

This winter conference will bring together experimentalists and theorists working on the physics of low-dimensional electronic materials. The focus will be on the synergy and cross-fertilization of work on the various systems of current interest, with as much emphasis on the identification of common themes, challenges and approaches as on cutting edge research in each class of systems. Invited talks will be complemented by additional talks selected from abstracts submitted by participants and by poster sessions; the participation of junior scientists is strongly encouraged. This conference represents a unique opportunity for participants to grasp the remarkable recent progress in the physics of low-dimensional electronic materials and to identify key questions and novel approaches in a broader context.

Application deadline is November 15, 2011

Please complete your application at: www.aspenphys.org

ORGANIZERS:

Gabriel Aeppli (University College London & London Centre for Nanotechnology)

Andrea Cavalleri (Oxford University & Max Planck Hamburg)

Joel Moore (University of California, Berkeley/LBNL)

Chetan Nayak (Microsoft Station Q/UCSB)

Karin Rabe (Rutgers University)

Matthias Troyer (ETH Zurich)

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ASPEN CENTER FOR PHYSICS

2012 WINTER CONFERENCE

ON

PARTICLE PHYSICS

February 11 – 17, 2012,

Saturday Evening Reception

Meetings Sunday morning through Friday noon

THE HUNT FOR NEW PARTICLES FROM THE ALPS TO THE PLAINS TO THE ROCKIES

Particle physics is about to experience one of its most exciting years in recent history. By winter 2012, the LHC experiments (in the Alps) are expected to have analyzed several orders of magnitude more data than for their first results of early 2011 and analyses from the final run of the Tevatron (in the Plains) will be nearing completion. There is great potential for discoveries of new particles, or laws of nature. We plan to gather together (in the Rockies) a diverse group of experimentalists and theorists and incite energetic exchange of ideas, information and knowledge gathered at the newly explored frontiers of particle physics, that will shape the future of the field. In addition to the hunt for new particles at colliders, our current understanding of the nature of electroweak scale dark matter will also be highlighted, as well as the latest results on heavy-ion, neutrino and heavy flavor physics.

Application deadline is December 1, 2011

Please complete your application at: www.aspenphys.org

Conference Website: <https://indico.cern.ch/conferenceDisplay.py?confId=143360>

ORGANIZERS:

John Campbell, Fermilab

Patrick Fox, Fermilab

Ivan Furic, University of Florida

Eva Halkiadakis, Rutgers University

Daniel Whiteson, UC Irvine

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ASPEN CENTER FOR PHYSICS

Celebrating 50 Years

1962 - 2012

SUMMER PROGRAM MAY 20 TO SEPTEMBER 9, 2012

The program of the Aspen Center for Physics is based on individual and collaborative research and the informal exchange of ideas. In an environment free from normal distractions, more than five hundred scientists from over a hundred U.S. and international institutions participate in the Center's summer program with eighty to ninety in residence at any one time. Research interests include astrophysics, biophysics, condensed matter physics, dynamical systems, elementary particle physics, mathematical physics and statistical physics. The stimulating interaction among participants with diverse interests and backgrounds is one of the most fruitful aspects of the program. Opportunities for collaboration and for initiating new research are always available as colleagues from a variety of subfields are present throughout the summer. In addition to the unstructured program of Individual Research and Working Groups, the following Informal Workshops are scheduled for the summer of 2012.

Informal Workshops

Non-Gaussianity as a Window to the Primordial Universe	May 20 to June 10
A Window on the Formation of the Milky Way	May 20 to June 10
Physics of Behavior	May 27 to June 17
The Physics of Feedback Processes and Their Role in Galaxy Evolution	June 10 to July 1
Stochastic Flows and Climate Modeling	June 10 to July 1
The Evolution of Massive Stars and Progenitors of GRBs	June 17 to July 1
Exact Results in Gauge Theory and Their Applications	July 1 to July 22
Spin-Orbit Physics in Correlated Electron Systems	July 1 to July 29
The LHC Shows the Way	July 22 to Aug 12
Large Fluctuations and Collective Behavior in Solids	July 29 to Aug 19
New Particle Physics at the LHC and Its Connection to Dark Matter	Aug 12 to Sept 9
Disorder, Algorithms and Complexity	Aug 19 to Sept 9
Evolutionary Dynamics and Information Hierarchies in Biological Systems	Aug 19 to Sept 9

Proposals for 2013 Summer Workshops are invited.

Proposal information and submission are available on our website at www.aspenphys.org. Proposals should be completed by June 30, 2012. Those received after this date will be considered only in exceptional circumstances.

Proposals for the 2013 Winter Conference are also invited.

They should be completed by January 15, 2012.

Physicists who wish to pursue a serious program of research at the Center are invited to apply. Applications by small working groups and independent researchers are strongly encouraged. An effort is made to select a diversity of participants from a wide field of physics, ranging in experience from post-doctoral fellows to senior scientists, and representing a variety of institutions. Special consideration is given to physicists who have never participated or who have not participated recently. The Aspen Center for Physics is committed to the significant participation of women and under-represented groups in all of its programs. While there are no experimental facilities available, experimentalists are encouraged to participate in the Center's programs.

Many summer participants bring their families with them to Aspen. Numerous childcare and day camp options are available within the Aspen/Snowmass area and current information and advice is available through the Center and local websites. Weekly picnics at the Physics Center give families an opportunity to meet and share activities.

Individual participants must provide their own salaries from their contracts, grants, fellowships or regular appointments. Through a grant from the NSF, the Center provides partial financial support for the housing we arrange for you.

Application Deadline is January 31, 2012

More detailed information and online applications at www.aspenphys.org

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Programs are supported by the National Science Foundation
and corporate and private donations.

The Aspen Center for Physics continues to be guided by a policy of
equal opportunity and non-discrimination.

