Physics 205 – Introduction to Research in Physics – Winter Quarter 2014

Syllabus

Physics 205 meets Mondays 4-5:45 pm in ISB 231. All new Physics graduate students must register. Requirements: Attend every class (at most one will be excused) and turn in proposals for two different research topics that interest you, each proposal 1 or 2 pages in length, based on Phys 205 lectures and follow-up meetings with relevant Physics faculty members. Grades will be based primarily on the quality of your research proposals. For more about these research proposals, please see the other side of this page.

Instructor: Joel Primack – ISB 318, 831 459 2580, joel@ucsc.edu
office hours: Wed 2-3 pm or by appointment
lecture slides: Physics 205 website: http://physics.ucsc.edu/~joel/Phys205/

Date Lecturers and Topics

Jan 6 Joel Primack – Physics as a Profession

Jan 13 Michael Dine – Interpreting LHC Physics
Howard Haber – Theory and Phenomenology of the Terascale
Bruce Schumm & Jason Nielsen – ILC and LHC Experiments

Jan 27 Sriram Shastry – Superconductors, Magnets, Thermoelectrics
Sasha Sher – Imaging of Neural Function and Structure
Sue Carter – Renewable Energy Systems

Feb 3 David Smith – X-ray Astronomy and Geophysics
Steve Ritz – Fermi Gamma-ray Space Telescope and LSST
David Williams – Very High Energy Gamma Ray Astrophysics

Feb 10 Tesla Jeltema – Observational Cosmology and Particle Astrophysics
Robert Johnson - Proton Computed Tomography Project
Joshua Deutsch – Biophysics & Condensed Matter Theory

Feb 24 Bud Bridges – Crystal Structure and Microscopic Properties
David Belanger – Phase Transitions and Magnetism in $LaCoO_3$
Art Ramirez – Strongly Correlated Matter

Mar 3 Stefano Profumo – Quantum-Cosmos Physics Interface: Dark Matter & Baryogenesis
Tom Banks – Holographic Space-Time
Anthony Aguirre – Testing theories of the super-early universe

Mar 10 Joel Primack – Physics Ethics
(Student Research Proposals Due)

Physics 205 Research Proposals

Each research proposal should say what physics question you want to answer, what method(s) you propose to use, what information and resources (e.g., experimental apparatus, computational capability, and funding) you expect to need, how long you expect this project to take, and other relevant information including why you are especially interested in this project and what you might want to do next if the project succeeds.

In preparing your research proposals, you should meet with a relevant faculty member to get advice on the topic and the questions in the previous paragraph, and also to help you choose a subject that the faculty member is willing to supervise – and possibly even provide financial support. The PhD is a research degree. Preparing the Physics 205 proposals should help you learn how to think more clearly about potential research projects, and help you begin to do research here at UCSC on a topic that interests you.

Your two research proposals are due at the last meeting of Physics 205, Monday March 11. However, if you submit drafts to me before then, then I will return them to you with comments that may help you improve them. You are welcome to submit your research project summaries by email to joel@physics.ucsc.edu (please also cc a copy to the faculty members with whom you discussed each proposal).

Note: The Physics 205 website is http://physics.ucsc.edu/~joel/Phys205/ and the password for any password-protected file is Phys205 .