

KAVLI INSTITUTE FOR THEORETICAL PHYSICS

Presents

The Sixty-First KITP Public Lecture

Sponsored by Friends of KITP

Andreas Kronfeld

Weight, Weight... Do Tell Me!

QCD and the Origin of Mass

Mass, and its origin, are mysterious. We know that the mass of everyday objects comes from the nucleons (protons and neutrons) in the nuclei of atoms. Simply count the number of these nucleons and you have a good idea of an object's mass. According to quantum chromodynamics (QCD), each proton or neutron consists of three quarks and some gluons. However, the combined mass of the quarks and gluons is only 1% of a nucleon's – what gives? Interactions between these tiny particles are the problem: they look simple in one way, but as interactions accumulate, supercomputers are needed to keep track of them. Over the past decade, looking at interactions as a way of understanding QCD has blossomed into a successful enterprise, solving old problems in physics and aiding new experiments. Beyond the mass of the proton (and you), these tools can broadly probe the mysteries of QCD to address problems in particle, nuclear and astrophysics.

About the Speaker

ANDREAS KRONFELD is a scientist in the Theoretical Physics Department of the Fermi National Accelerator Laboratory (Fermilab) and a Hans Fischer Senior Fellow in the Institute for Advanced Study at the Technical University of Munich. He has been developing new ideas and methods for understanding QCD since his days as a Ph.D. student at Cornell University. Prominent among his achievements are some of the first predictions of QCD interaction rates and the mass of an exotic particle with both “beauty” and “charm,” results which were subsequently confirmed by laboratory measurements. For these efforts he has been elected fellow of the American Physical Society and also of the American Association for the Advancement of Science.

Wednesday, September 23, 2015
8:00 PM (reserved seats held until 7:50 PM)



Admission is Free
RSVP by September 21 at
[http://www.kitp.ucsb.edu/
public-lecture-rsvp](http://www.kitp.ucsb.edu/public-lecture-rsvp)
or call

(805) 893-6363

**There will be open seating,
but a reservation is required**

Note UCSB location

**KOHN HALL,
Main Seminar Room**

LOT 10 PARKING

From the roundabout at Hwy 217, turn right onto Mesa Rd, merge into left lane, turn left at the first light into Lot 10 parking structure. **PARK, BUY a \$4 permit** from the dispenser (near the elevator and stairs), **DISPLAY PERMIT** on dashboard. The KITP is right next door.

*The KITP gratefully acknowledges its
many friends in the community.*

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