

Physics Colloquium

Testing the Standard Model and Searching for *the Dark Side* Using Atomic Physics

Wednesday, February 17
2:00 pm
RNS 210
Refreshments served!



Holger Müller

Holger Müller successfully applied for his first patent when he was 14. Later, he did his undergraduate thesis with Jürgen Mlynek at the University of Konstanz, Germany. He graduated from Humboldt-University, Berlin, with Achim Peters as advisor. Müller received a fellowship of the Alexander von Humboldt foundation and joined the group of Steven Chu in Stanford as a postdoc. In July 2008, he joined the physics faculty at U.C. Berkeley.

The standard model of particle physics has been enormously successful, yet unable to account for dark matter and dark energy - mysterious stuff whose gravity holds galaxies together and drives the accelerated expansion of the universe, respectively. Physicists have long assumed that the dark sector would at least partially consist of new, relatively massive particles, but have not been able to turn up uncontested evidence for them. A dark sector made of very light particles, however, could have escaped detection in any experiment conducted so far, yet is compatible with all astronomical and cosmological evidence. Precision measurements in physics are suitable to searching for such ultralight dark-sector candidates.

Professor Müller will give an overview of recently proposed experiments and theoretical models. As first steps, he will report on two of his own experiments. The first measures the fine-structure constant and thereby conducts a broad test of the standard model at extremely high precision. The other constrains the chameleon model of dark energy.