PHYSICS SEMINAR

DEPARTMENT OF PHYSICS

TEXAS SOUTHERN UNIVERSITY

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Fundamental Constants: Theory and Experiment

Monday, August 19, 2013
9:45 – 10:45 A.M.
Room 154, New Science Bldg*

Abstract

In recent years, through a combination of advanced theoretical methods and experimental progress, it has been possible to advance the determination of fundamental constants to a level that was thought to be impossible to achieve only a few years ago. The quantum electrodynamic theory of bound states has played a crucial role in this endeavor, and related results will be reviewed. An overview of the intricacies of the formalism will also be given. The current muonic hydrogen discrepancy, which has found a tremendous echo in the media, will be highlighted as one of the most interesting fundamental physics questions currently "on the market". Starting from the evaluation of the so-called virtual or "loop" corrections, which can be described through effective operators or form-factor corrections to the Dirac equation (in first approximation), we shall ask what other generalizations of the Dirac equation (pseudo-scalar mass terms or curved space-times) could lead to additional insight summarized in an upcoming textbook (Wiley publishers) on Bound-State Quantum Electrodynamics which will also cover topics in intense-field laser physics.

Dr. Jentschura is an accomplished physicist with over 150 research publications and two books. He is a member of the Editorial Board of Physical Review A and Adjunct Professor at the University of Heidelberg, Germany. He has won various awards including the 2012 Distinguished Guest Scientists Award of the Hungarian Academy of Sciences, the 2005 Heisenberg Award of the Deutsche Forschungsgemeinschaft, as well as the 2000 Georg-Helm Prize of TU Dresden in recognition of his Ph.D. thesis.

*Paid visitor parking at intersection of Blodgett and Ennis. Refreshments will be served.