

# UNIVERSITY OF TEXAS AT DALLAS - DEPARTMENT OF PHYSICS

## PHYSICS COLLOQUIUM

<http://www.utdallas.edu/physics/lectures/info/>

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Wednesday, October 25, 2006; 4:00-5:00 PM  
Kusch Auditorium, FN 2.102

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### Precision Measurement of Gravity, Time, and Distance

**Professor L. J. Wang**

*Institute of Optics, Information, and Photonics, Max-Planck Research Group and the University of Erlangen-Nuremberg, Germany*

I describe our recent efforts, progress, and results in various high-precision measurement experiments. These efforts include measuring  $g$ , aiming at the  $10^{-9}$  (ppb) level, and small forces at the femto-Newton level. In time measurement, we implemented an optical “clock,” based on a single trapped ion, reaching several parts in  $10^{14}$ . And in distance and air refractive index measurement, we reached a  $5 \times 10^{-9}$  sensitivity using a frequency comb technique.

Precision measurements yield various applications in geophysics, mining/exploration, earth-crust dynamics, test of general and special relativity, the GPS system, test of fundamental physical constants variation, and future space missions. I will also describe and summarize our activities in other areas.

**About the speaker:** Dr. Lijun Wang received his Ph.D. from University of Rochester in 1992. He worked as a research and senior scientist at Duke University and Princeton-based NEC Research Laboratories before becoming Director of the Institute for Optics, Information, and Photonics. He also serves a Chair Professor of Experimental Physics, Friedrich-Alexander University of Erlangen-Nuremberg. His current research interests are mainly in precision measurements and instrumentation, atomic physics and quantum optics, ion trapping, gravitational measurements, and material processing using ultrafast lasers.