

SEMINAR IN PHYSICS

Friday, January 15, 2016
3:30-4:25 – Ross 0220

~ Refreshments! ~

The Optical Tweezers and Its Applications

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An Optical Tweezers, a real life tractor-beam, uses infrared lasers to manipulate the position of microscopic objects such as bacteria or glass beads. Optical tweezers can also measure forces acting on these objects with pico-newton accuracy. Since infrared lasers are safe for biological samples, the optical tweezers become a unique tool for biology related research. Several interesting applications are planned to be explored here at UNC, including DNA stretching and protein force studies.

Binding Nanoparticle Quantum Dots with DNA

Alexander Lidiak

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Effective use of semiconducting nanoparticles may afford great leaps in technologies such as solar cells, bio-sensors, optical filters, and even quantum computing. But in order to perform various tasks, and to perform them well, the nanoparticles must be organized and structured in a specific way. In Dr. Sung's Nano Research Lab, my colleague and I use single stranded deoxyribonucleic acid (ssDNA) as tethers to combine nanoparticles called quantum dots (QDs). The connection is not only flexible and sturdy, but programmable. The length of the connection can be altered by reducing or increasing the number of nucleotides on the ssDNA, and complex structures can be created using DNA origami method. The optical and electrical properties of QD-DNA structures will be explored for possible applications.