

## Announcing the Final Examination of Lin Yuqing for the Degree of Doctor of Philosophy in Physics

**Date:** Monday, May 4th, 2015

**Time:** 8:30 a.m.

**Room:** PSB445

**Dissertation title:**

Resistive pulse study of liposomes

### **Abstract:**

In this work, the properties of the liposomes, the artificially created vesicles by various methods, are explored by a resistive pulse method using micropipettes. The fact that vesicles are fundamental in the wide range of functionalities they fulfill as organelles strengthen the desire of understanding the properties of them. The motivation of this work comes from the significant roles that liposomes play in the development of targeted drug delivery systems. Among other significant variables, the size of liposomes is found to be one of the dominating parameters in liposome based drug delivery, and the correlation between liposome size and delivery efficiency is discussed. To help improving the size evaluation ability, a few mainstream methods for liposome size detection and measurements are reviewed. As a reliable and accessible alternative method for liposomes detection, the resistive pulse method is introduced and the measurement on liposomes size change upon pH gradient was performed using this method. With our current liposome composition, we found the size increases as environmental pH increases. Further investigation is performed with vesicular pH=6, 7, and 8, respectively. Lastly, the stability of the small unilamellar vesicles (SUV) was studied via resistive pulse method, by monitoring the size change of 50nm liposomes as function of time. A significant size change in freshly prepared 50nm liposomes are recorded. This information will provide invaluable knowledge for targeting tumor with tight tissues, where small size liposomes are needed.

### **Outline of Studies:**

Major: Physics

### **Educational Career:**

M. S. University of Central Florida, USA, 2010

B. S. Beijing Normal University, PRC, 2008

### **Committee in Charge:**

Dr. Lee Chow (Chair)

Dr. Suren Tatulian

Dr. Alfons Shulte

Dr. Peter Yuan (External Committee Member)

Approved for distribution by Dr. Lee Chow, Committee Chair, on April 27th, 2015.

The public is welcome to attend.