UNIVERSITY of GUELPH
Department of PHYSICS
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MSc Defense

Miranda Schmidt

Date: Friday August 19th, 2011

Time: 10:00a.m.

Location: Science Complex 1511

Title: Detecting Critical Fluctuations in Ternary Model Membrane Systems of DOPC, DPPC, and Cholesterol Using NMR Spectroscopy

Abstract: This study investigated the critical behaviour of ternary mixtures of DOPC and DPPC, with cholesterol. The properties of model membranes such as these are studied in order to provide insight into aspects of complex biological systems. Experiments were performed using the Jeener echo, a static solid-state NMR technique, however no information about the critical phenomena was obtained. Conversely, the sideband linewidths measured from ^{2}H MAS NMR are sensitive to temperature and dependent upon the phase behaviour. By fitting the linewidth data to an equation from Suwelack *et al.* (J. Chem. Phys., 1980; 73(6):2559-2569), the critical temperature and the critical exponent for the correlation length of the system were calculated. The critical exponent values obtained from these samples ranged between $\nu_c = 0.65$ and $\nu_c = 1.2$, which encompasses the critical exponents for both the 2D and 3D Ising models. The universality class for these model membranes cannot be unambiguously assigned yet.

Advisor: J. Davis
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