

Abstract Submitted
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Using Neutron Spectroscopy to Study Collective Dynamics of Biological and Model Membrane Systems MAIKEL RHEINSTADTER, University of Missouri-Columbia — Only recently, it has become possible to study collective dynamics of planar lipid bilayers using neutron spectroscopy techniques. By combining different neutron scattering techniques, namely three-axis, backscattering and spin-echo spectroscopy, we present measurements of short and long wavelength collective fluctuations in biomimetic and biological membranes in a large range in momentum and energy transfer, covering time scales from about 0.1ps to almost 1 μ s and length scales from 3Å to about 0.1 μ m [1-4]. The measurements offer a large window of length and time scales to test and refine theoretical models of dynamics of biomimetic and biological membranes. The objective of this project is to establish dynamics-function relationships in artificial and biological membranes to relate in particular the collective dynamics, i.e., phonons, to key functions of the membranes, as, e.g., transport processes within and across the bilayers. M.C. Rheinstädter, C. Ollinger, G. Fragneto, F. Demmel, T. Salditt, *Phys. Rev. Lett.* **93**, 108107 (2004).² Maikel C. Rheinstädter, Tilo Seydel, Franz Demmel, Tim Salditt, *Phys. Rev. E* **71**, 061908 (2005).³ Maikel C. Rheinstädter, Wolfgang Häußler, Tim Salditt, *Phys. Rev. Lett.* **97**, 048103 (2006).⁴ Maikel C. Rheinstädter, Tilo Seydel, Tim Salditt, submitted to PRE, cond-mat/0607514.

Maikel Rheinstadter
University of Missouri-Columbia

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