## Abstract Submitted for the MAR06 Meeting of The American Physical Society

Stabilization of Model Membrane Systems by Disaccharides. Quasielastic Neutron Scattering Experiments and Atomistic Simulations EMMANOUIL DOXASTAKIS, Dept. of Chem. & Biol. Engr., Univ. of Wisconsin, VICTORIA GARCIA SAKAI, NIST Center for Neutron Research and Univ. of Maryland, SATOSHI OHTAKE, Dept. of Chem. & Biol. Engr., Univ. of Wisconsin, JANNA K. MARANAS, Dept. of Chem. Engr., Penn. State University, JUAN J. DE PABLO, Dept. of Chem. & Biol. Engr., Univ. of Wisconsin Trehalose, a disaccharide of glucose, is often used for the stabilization of cell membranes in the absence of water. This work studies the effects of trehalose on model membrane systems as they undergo a melting transition using a combination of experimental methods and atomistic molecular simulations. Quasielastic neutron scattering experiments on selectively deuterated samples provide the incoherent dynamic structure over a wide time range. Elastic scans probing the lipid tail dynamics display clear evidence of a main melting transition that is significantly lowered in the presence of trehalose. Lipid headgroup mobility is considerably restricted at high temperatures and directly associated with the dynamics of the sugar in the mixture. Molecular simulations provide a detailed overview of the dynamics and their spatial and time dependence. The combined simulation and experimental methodology offers a unique, molecular view of the physics of systems commonly employed in cryopreservation and lyophilization processes.

Emmanouil Doxastakis Dept. of Chem. & Biol. Engr., Univ. of Wisconsin

Date submitted: 10 Jan 2006 Electronic form version 1.4