

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Toward a unified view of the structure and dynamics of water associated with single-supported zwitterionic and anionic membranes¹

ZACHARY BUCK, Univ of Missouri, ANDREW MISKOWIEC, Oak Ridge National Lab, HELMUT KAISER, Univ of Missouri Research Reactor, GAVIN KING, HASKELL TAUB, Univ of Missouri, FLEMMING HANSEN, Technical Univ of Denmark, MADHUSUDAN TYAGI, NIST Center for Neutron Research, SOULEYMANE DIALLO, EUGENE MAMONTOV, KENNETH HERWIG, Oak Ridge National Lab — High-resolution quasielastic neutron scattering was used to investigate the diffusive motion of water associated with single-supported bilayers of the zwitterionic lipid DMPC [1] and the anionic lipid DMPG [2]. The temperature dependence of the elastically-scattered neutron intensity from these samples indicates a series of freezing and melting transitions of the hydration water which differ greatly depending on the charge state of the lipid [2]. We interpret these distinct transitions as evidence of different types of water common to the two membranes: bulk-like water probably located above the membrane and two types of confined water in closer proximity to the lipid head groups. The temperature dependence of the diffusion coefficient of the hydration water determined for both membranes supports the interpretation of distinct water types each with its characteristic translational diffusion rate. Although sharing water types, the two membranes differ greatly in the temperature range over which their water freezing and melting transitions occur. [1] M. Bai *et al.*, *Europhys. Lett.* **98**, 48006 (2012). [2] A. Miskowiec *et al.*, *Europhys. Lett.* **107**, 28008 (2014).

¹Supported by NSF Grant Nos. DMR-0944772 and DGE-1069091

Zachary Buck
Univ of Missouri - Columbia

Date submitted: 14 Nov 2014

Electronic form version 1.4