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Wetting and freezing of water on supported bilayer lipid membranes[1] ZACHARY BUCK, ANDREW MISKOWIEC, MIA BROWN, HELMUT KAISER, GAVIN KING, RENEE JIJI, JASON COOLEY, HASKELL TAUB, University of Missouri - Columbia, FLEMMING HANSEN, Technical University of Denmark, MADHUSUDAN TYAGI, NIST Center for Neutron Research, SOULEYMANE DIALLO, EUGENE MAMONTOV, KENNETH HERWIG, Oak Ridge National Laboratory — Temperature-dependent elastic incoherent neutron scattering shows qualitatively different behavior for water associated with single bilayers of the charge-neutral DMPC (dimyristoylphosphocholine) lipid than for the anionic DMPG (dimyristoylphosphoglycerol) bilayer supported on an SiO_2-coated silicon substrate. For the neutral DMPC membrane, the membrane-associated water shows a step-like freezing transition somewhat below the bulk freezing point followed by a continuous freezing behavior and, on heating, a step-like melting transition at the bulk melting point of 273 K [2]. In contrast, water near the anionic DMPG membrane shows only continuous freezing that extends to much lower temperatures than for DMPC and continuous melting that is complete well below the bulk melting point. We suggest that these results may be explained by a film-like water structure in the DMPG case owing to the hydrophilic nature of the membrane surface, while most of the water in the DMPC system is bulk-like and dewets from this more hydrophobic membrane surface. [2] M. Bai *et al.*, Europhys. Lett. **98**, 48006 (2012).

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