Abstract Submitted
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Studies of Dynamical Layering in Adsorbed Organic Films[1] A. DIAMA, M. SIMPSON, H. TAUB, U. Mo.-Columbia, F.Y. HANSEN, Tech. U. Denmark, R. DIMEO, D. NEUMANN, NIST, K.W. HERWIG, ORNL, U.G. VOLKMANN, P. U. Catolica Chile — It is well known from experiments using a surface force apparatus that organic fluids confined between two surfaces exhibit a layered structure at the molecular level. This static layering has motivated us to consider the possibility that the individual molecular layers in fluid films may also have different dynamical properties. We have found evidence of such dynamic layering effects in computer simulations of fluid heptane (n-C_7H_{16}) films and have therefore begun investigating the diffusive motion in films of longer alkanes of relevance to lubrication. Here we report high-resolution quasielastic neutron scattering (QNS) measurements on fluid monolayer, bilayer, and trilayer tetracosane (n-$C_{24}H_{50}$ or C24) films adsorbed on exfoliated graphite (Grafoil). We believe this system is favorable since the large aspect ratio of the C24 molecule may inhibit interlayer exchanges compared to a more spherical molecule. We discuss evidence of progressively faster diffusive motion in the lowest, middle, and top layers of the trilayer film. Molecular dynamics simulations are in progress in an effort to corroborate this interpretation.

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