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The effect of interlayer distance of thickness fluctuations in a swollen lamellar phase: A neutron spin echo study MICHIHIRO NAGAO, NIST Center for Neutron Research and Indiana University — Thickness fluctuations in surfactant membranes have been measured using small-angle neutron scattering (SANS) and neutron spin echo (NSE) techniques as a function of the membrane thickness in a swollen lamellar structure composed of nonionic surfactant, water and oil. An excess dynamics from the bending motion was observed around the length scales of the membrane thickness, which originates from thickness fluctuations of the membranes. The amount of oil in the bilayers controls the interlayer distance (membrane thickness) and the bending motion of the membranes. An enhancement of the thickness fluctuations suppresses the bending motion, which introduces the increase in the bending modulus at low swelling condition. The decrease in the bending modulus with further increase in the thickness indicates the decrease of the synchronization between monolayers. In the high swelling conditions, the monolayer movement dominates the dynamics of the membranes in the measured dynamic range.

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