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Effect of Hybrid Lipid on Line Tension in Lipid Membranes EDA BAYKAL-CAGLAR, JUYANG HUANG, Texas Tech University — Giant unilamellar vesicles (GUVs) made of at least three components, one being cholesterol, one a high-melting-point lipid and one a low-melting-point lipid, can exhibit coexisting $liquid_{ordered}$ -$liquid_{disordered}$ ($l_o - l_d$) phases. The energy per unit length of boundary is called line tension and it depends on the temperature of the system according to power law and vanishes at critical temperature. Universal scaling behavior can help us to understand the phase behavior of many different systems. Systems in the same universality class represent similar collective behavior in phase transitions apart from their physicals details. Critical exponents characterize the continuous phase transition of systems, and all systems belonging to a universality class will have the same critical exponents. In this work, we measured the critical exponent related to line tension using fluorescence microscopy and image processing. We investigated the effects of hybrid lipid on line tension and critical exponent. One chain of hybrid lipid is saturated and the other one is unsaturated, because of which they behave as linactants and can reduce the line tension. We prepared GUVs with three different compositions: DOPC/DSPC/Cholesterol 30:45:25, DOPC/DSPC/POPC/Cholesterol 22.5:45:25:7.5, DOPC/DSPC/POPC/Cholesterol 15:45:55:25. Our results show that the critical exponent associated with line tension gradually increase with hybrid lipid concentration. Having different values of critical exponent in different mixtures indicate that lipid bilayers cannot be classified as a universality class.

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