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**Multiscale Modeling of supported lipid bilayers** ROLAND FALLER, CHENYUE XING, MATTHEW HOOPES, UC Davis — The study of lipid structure and phase behavior at the nano scale length is of importance due to implications in understanding the role of the lipids in biochemical membrane processes. We performed a variety of simulations in homogeneous and heterogeneous membrane systems to elucidate such behaviors. Our simulations demonstrate that various coarse grained simulation models can predict different aspects of lipid phase separation and describe the change of the system under the influence of a support. The simulations are performed using models at different length scales ranging from the all atom scale to a scale where lipids are modeled by only three interaction sites. We are able to follow transformations, such as lipids phase transitions. These phase transitions are determined by analyzing parameters like area per lipid head group, the deuterium order parameter and dynamic properties. Additionally, we characterize individual lipid molecules using rotational correlation functions to classify different dynamic populations and we study the stability of artificially designed patterns. We discuss the changes of the system phase behavior as well as differences between the two leaflets as induced by the support.

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